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FOREST INSECT AND DISEASE CONDITIONS IN THE SOUTH, 1978

U.S. DEPARTMENT OF AGRICULTURE • FOREST SERVICE
Southeastern Area, State and Private Forestry
Forestry Report SA-FR 4 September 1979

Front Cover: Poplar tentmaker defoliation of a 6-year old cottonwood plantation in Arkansas; inset shows "tent" made by larvae.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Southeastern Area, State and Private Forestry
1720 Peachtree Road, N. W.
Atlanta, Georgia 30309

1630
January 28, 1980

Dear Friend:

Enclosed is a copy of Forestry Report SA-FR 4, Forest Insect and Disease Conditions in the South, 1978. (This publication was just received from the printer despite the "September 1979" date on the cover.)

One of our older mailing lists is being reactivated for use in distributing copies of this report. If you wish your name to remain on this list for future publications on forest insects and diseases in the South, please let me know. If your copy was forwarded to you by the Postal Service from a former address, please let us know of your current address. We will update our mailing list and retain only the addresses of those individuals who notify us of their desire to receive future copies of our forest insect and disease publications. If you have colleagues who would like to have their names on our mailing list, we will be happy to oblige if you (or they) will contact me.

Sincerely,

Harvey Toko

HARVEY V. TOKO
Staff Director
Forest Insect and Disease Management Staff

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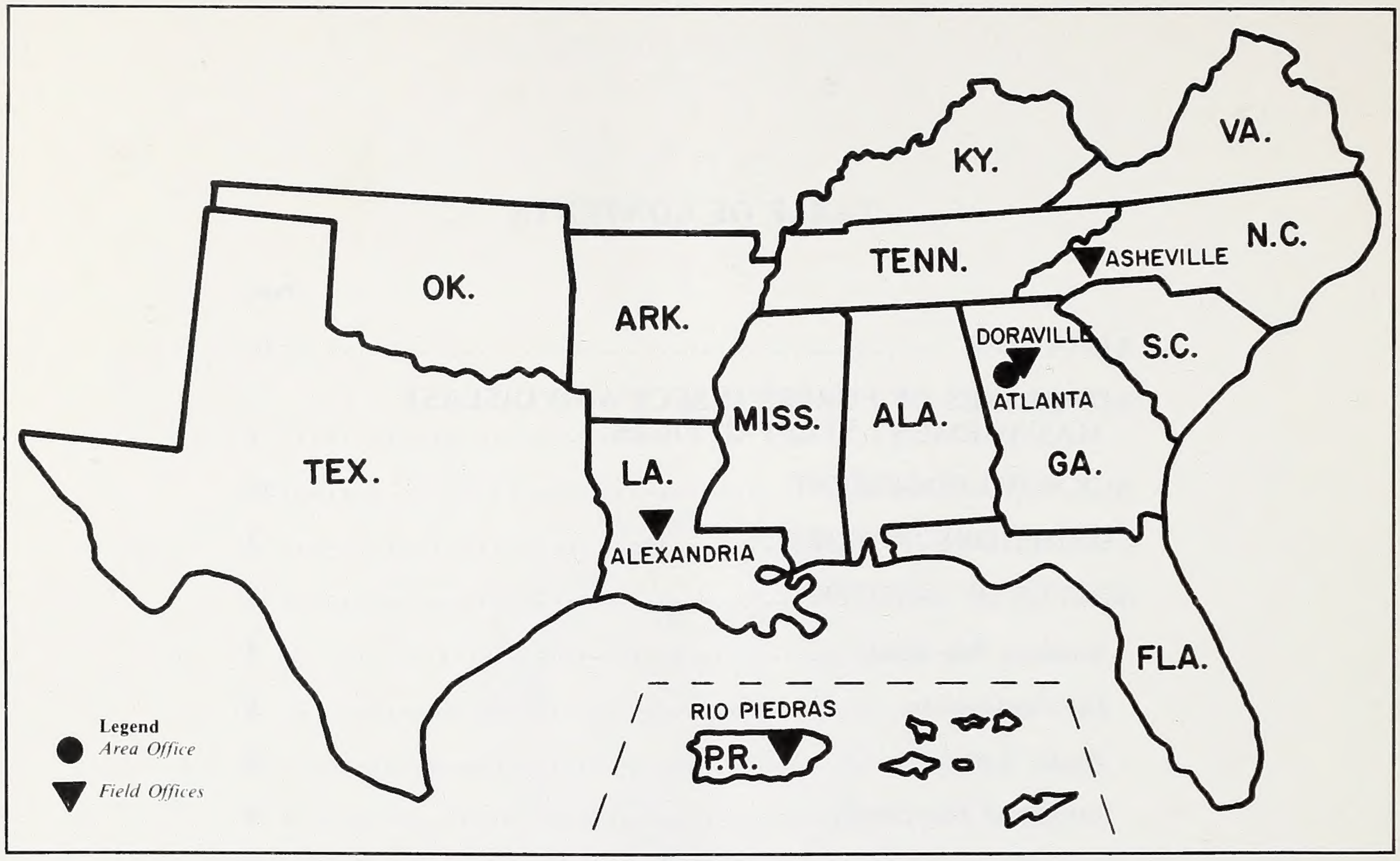
Figure 1.—States served by the Forest Service's Southeastern Area, State and Private Forestry.[1]



[1] *Puerto Rico and the Virgin Islands are also served by the Southeastern Area, State and Private Forestry.*

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ACKNOWLEDGEMENT

Appreciation is extended to State agencies whose assistance and cooperation made this report possible.

FOREST INSECT AND DISEASE CONDITIONS IN THE SOUTH, 1978

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CONDITIONS IN BRIEF

Forest trees in the South are subject to attack by about 30 species of insects that warrant comment in this report. Of these 30, two species cause destruction that is discussed in detail. The southern pine beetle's activity decreased in most areas in 1978, in contrast to the staggering losses it caused in several States in recent years. The 1978 findings show that beetle activity will probably be low enough in 1979 for control by State agencies.

National forests in Mississippi experienced moderate activity by the beetle in 1978, with little or no activity on National forests in Texas and Louisiana. Losses in these States and Arkansas were much larger in 1977. Six other Southern States have not had major problems with the beetle for 2 years. The southern pine beetle again became more active in Georgia in the fall of 1978.

Fall cankerworms defoliated 109,750 acres (44,415.8 ha) in 1978, as compared to 44,000 (1,780.7 ha) in 1977. Infestations adversely affected the aesthetic quality of recreation areas, including parts of the Appalachian Trail, thereby creating greater public awareness of the pests than occurred in other infested areas.

Seed orchards in the South experienced a general increase in problems from coneworms, in 1978. Losses to southern orchards from damage caused by conebeetles and coneborers diminished.

The following pages also mention major and minor diseases of trees in the South. Of these, three diseases had sufficient impact to warrant detailed comment. Annosus root rot, once viewed as an overwhelming threat, is still a major disease of pines, but shows signs of responding to control efforts recommended in recent publications. Fusiform rust on pines was once virtually unknown, but now occurs in at least 10 States. Recently published control methods may help reduce the impact of this disease, which causes losses estimated at more than 97 million cubic feet (2.746 million m^3) of growing stock.

Pitch canker has declined in severity in recent years. Although fewer stands of pines were subjected to heavy losses from pitch canker in 1978, the disease seems to be gradually increasing in western Florida.

The most widespread damage to all trees in the South results from a variety of decay organisms, mainly fungi, that cause heart rots. About 80 percent of all pest losses result from these decay organisms. Although they are a perennial problem, few field reports have been received about them and therefore they are included in the following sections headed, *Other Diseases* and *Nursery Diseases.* The most notable of the nursery diseases is charcoal or black root rot, which attacked pine seedlings in nurseries in five Southern States in 1978.

One major group of fungi, mycorrhizae, is discussed in a section separate from forest diseases because these fungi are beneficial organisms. Moreover, they could have an important part to play in establishing new forests in the future. These fungi live on or in the roots of several major tree species, resulting in a mutually beneficial partnership called a mycorrhizal relationship. Recent progress in research and in field evaluations indicates these fungi may have practical use for seedlings grown in nurseries treated with the fungi — and in subsequent outplantings. Such seedlings had significantly greater survival and growth than did seedlings from conventional nursery plots. The gain in plantable seedlings would be worth an estimated $850,000 for the 55 southern forest tree nurseries.

Throughout the Southeast, drought has caused wilting and premature loss of foliage and, in some cases, death of trees. This natural factor is also subjecting the stressed trees to insect attack and disease development. These factors in succession will causes losses throughout the area.

STATUS OF INSECTS

SOUTHERN PINE BEETLE

The current distribution of the southern pine beetle, *Dendroctonus frontalis* Zimm., in the South Central States is shown in figure 2.

Southern pine beetle (SPB) activity in State and private lands has decreased considerably during 1978. In Texas, Arkansas, Mississippi, and Louisiana, SPB spots detected averaged only 10 percent of the number spotted during 1977. East Texas has shown the most dramatic decrease in beetle activity with over 4,000 SPB spots recorded in 1977, and less than 50 recorded during 1978. Following is a summary of SPB spots and timber salvaged from January through September 1978.

	Spots	Volume salvaged	
	Number	*MBF*	*Cords*
Alabama	0	0	0
Arkansas	171	138	1,409
Louisiana	34	10	230
Mississippi	299	273	1,794
Oklahoma	108	Salvage figures not available	
Texas	50	13	102
Total	662	434	3,535

In Mississippi, SPB activity has concentrated in the east-central and northeast parts of the State. Large infestations (averaging 57 trees per spot) continue to occur, and activity is expected to remain at the current level throughout next year.

None of the States will be cooperating in State-Federal SPB suppression projects for 1979. SPB activity is expected to remain low enough to be suppressed by regular State salvage procedures.

Similarly, southern pine beetle activity on Federal lands has also decreased markedly (figure 3). National forest lands in Mississippi, east Texas and Louisiana which were subjected to epidemics

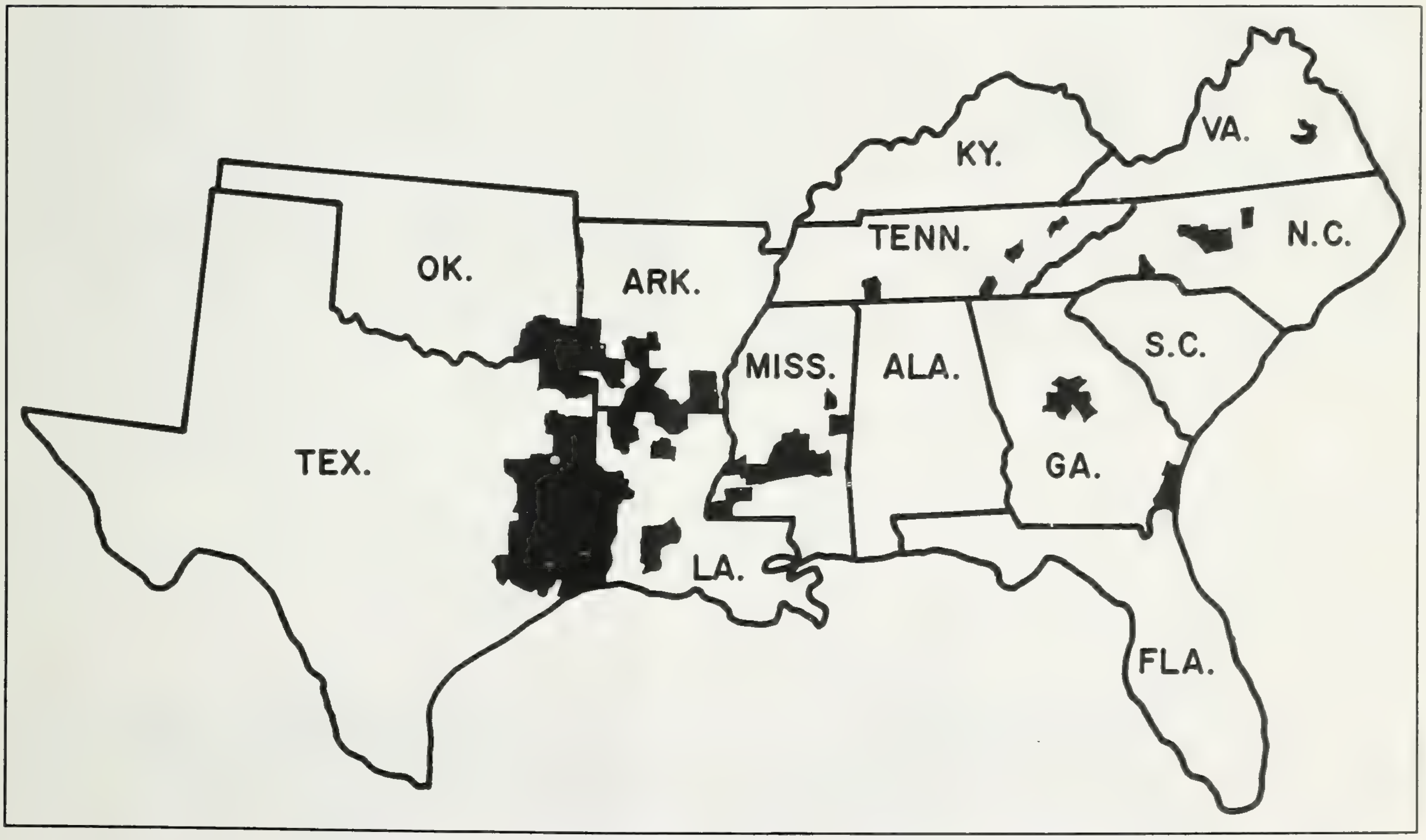


Figure 2.—Southern pine beetle distribution, 1978.

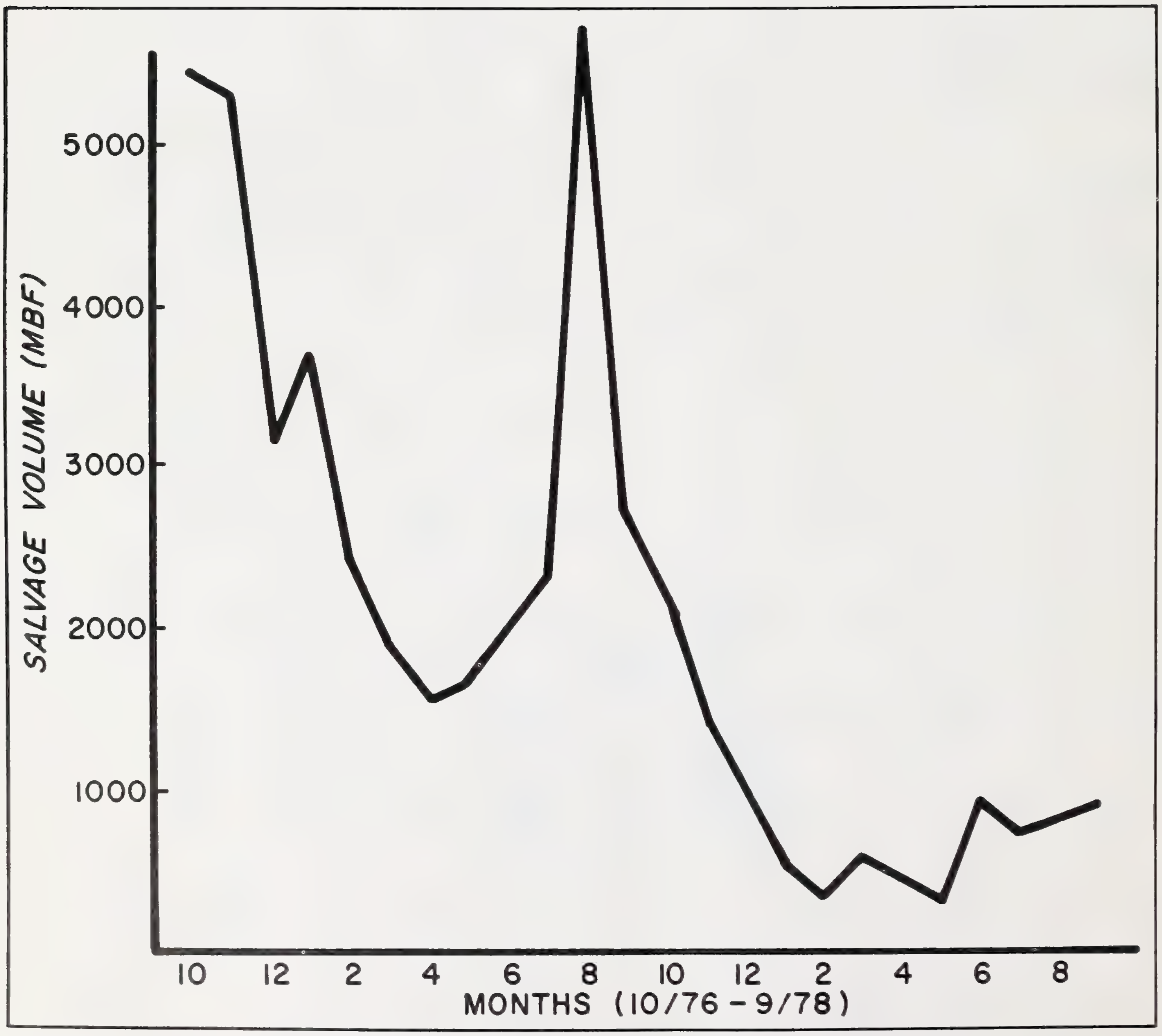
from 1975-1977, but in 1978 experienced moderate, low and little to no activity, respectively. Table 1 summarizes the SPB situation in four Central and West Gulf States.

In Mississippi, southern pine beetle activity was most prominent on the Bienville and Tombigee National Forests. Evaluation of data collected at the time of biological evaluations suggested that southern pine beetle populations were static to slightly increasing on the Bienville National Forest and definitely increasing on the Ackerman Unit, Tombigee National Forest. Activity was also prevalent on the Homochitto National Forest. Ninety percent of all beetle infestation on this Forest was associated with lightning strikes.

The staggering losses experienced by National forests in east Texas for the past 3 to 4 years did not reoccur this year. All districts reported relatively low activity throughout most of the year as shown in table 1. At the present time SPB populations in east Texas appear to be endemic. The situation is similar on Federal lands in Louisiana, Oklahoma, Arkansas, and Alabama.

Southern pine beetle activity in Virginia, Kentucky, North Carolina, South Carolina, Tennessee and Florida has been extremely low since the summer of 1976. In 1978, a few small spots were reported during the late summer in Virginia, North Carolina and Tennessee. In Georgia, however, the activity seems to be on the upswing again. An aerial survey of the Oconee National Forest near Macon, Ga., shows that approximately 100 spots ranging from 10 to 200 trees now exist on the Forest. If the forests in the southeast continue to experience drought stressed conditions, southern pine beetle populations will continue to increase and could

Figure 3.—SPB salvage volume[1] removed from National Forests in Central and West Gulf States.[2]



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[1] *Does not include approximately 1,000 MBF taken from Mississippi during fiscal year 1978.*

[2] *Includes Alabama, Arkansas, Louisiana, Oklahoma, Mississippi and Texas.*

possibly grow to outbreak proportions by the fall of 1979.

Table 1.—Summary of SPB situation in four Central and West Gulf States, January through September, 1978.

National	Number SPB	*Stems*		
Forest	Spots	*Volume Salvaged*		*Chemically*
Locations	Observed	MBF	CCF	Treated
Louisiana	15	120.00	267.00	
Mississippi	2,301[1]	3,729.13	716.52	1,511
Oklahoma[2]	801	394.86	35.90	
Texas	339	668.73	--	
Total	3,456	4,912.72	1,019.42	1,511

[1] These figures include numerous lightning strikes and SPB infestations detected on the ground and salvaged removed by operators.

[2] Tiak Division of Ouachita National Forest, Idabel, Okla.

FALL CANKERWORM

The current distribution of the fall cankerworm, *Alsophila pometaria* Harr, is shown in figure 4. The area of infestation continued to increase in 1978. Activity is centered in Georgia, North Carolina, and Tennessee. New areas of defoliation were detected on the Cherokee National Forest in Tennessee, and Cumberland Gap National Historic Park in Kentucky. Acreage defoliated by the fall cankerworm from 1970 to 1978 is shown below.

State	*1970*	*1974*	*1976*	*1978*
Georgia			24,000	60,000
Kentucky				250
North Carolina	800	4,000	20,000	45,500
Tennessee				4,000
Total	800	4,000	44,000	109,750

In Georgia, the infestation continues to move southwestward, covering an additional 8,000 acres (3,237.6 ha). North Carolina showed increases in acreage defoliated, but also signs of declining infestations. The infestation on the Coweeta Hydrologic Laboratory where the current outbreak was first detected in 1968, has collapsed. Egg parasitism by a wasp, *Telenomus alsophilae* Vier., was probably responsible. The wasp deposits its own eggs in those of the cankerworm. Upon hatching, the wasp larvae consume their hosts. Over 95 percent of some egg masses contained the wasp parasites.

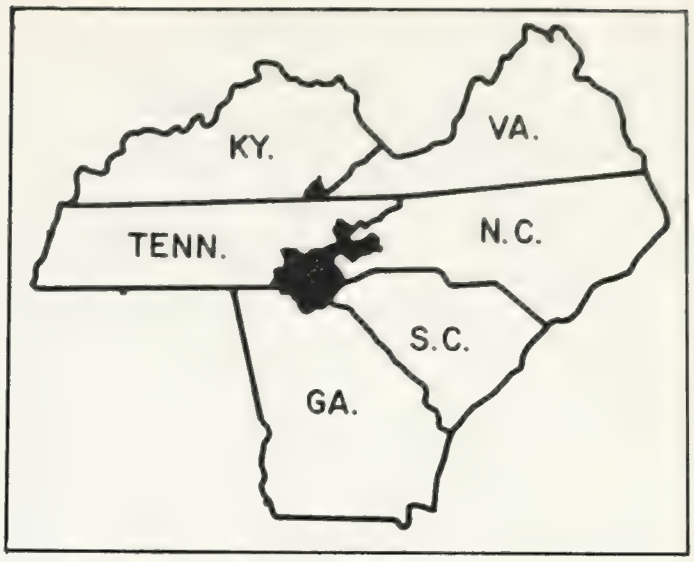


Figure 4.—Fall cankerworm distribution.

Currently, defoliation in many of the older infestation areas is decreasing in severity, particularly in the northernmost part of Georgia and adjacent areas in North Carolina.

Damage caused by this insect is primary to the aesthetics of the area. Defoliation is unsightly in the spring and early summer. Cankerworms also caused public concern on the Appalachian Trail, in private and Federal campgrounds, and picnic areas within the defoliated areas. A nuisance effect results when the young larvae hang down on silken strands and the frass rains down on the users of these recreation areas.

The following figures show the estimated acreage of light to heavy defoliation by location within each State, in 1978.

Location	**Acreage defoliated**
Georgia	
Chattahoochee National Forest	60,000
Kentucky	
Cumberland Gap National Historic Park	250
North Carolina	
Blue Ridge Parkway	1,500
Nantahala National Forest	42,000
Pisgah National Forest	2,000
Tennessee	
Cherokee National Forest	4,000
Total	109,750

POPLAR TENTMAKER

The poplar tentmaker, *Icthyura inclusa* Hubner, which feeds on poplars and willows, first became a pest of hybrid cottonwood plantations, in 1977. Earlier, the tentmaker had been an endemic species in natural stands of cottonwood. Occasionally, enough damage was done on individual trees that defoliation could be seen from the ground. However, there was no record of complete defoliation of even a single cottonwood tree in the Lower Mississippi River Delta by the poplar tentmaker. Yet, in September and October of 1977, this insect defoliated approximately 20,000 acres (8,094 ha) of cottonwood plantations. Then, during 1978, it completely or partially defoliated 10,000 acres (4,047 ha) of plantations and thousands of acres of natural stands of cottonwood and willow in the Lower Mississippi River Delta. Some plantations were defoliated as early as July 21, and others were not defoliated until September 20. Generally, plantations that were defoliated early in the growing season were defoliated at least once more that year. The time in which a stand can be defoliated is amazing! In July 1978, second-generation larvae completely defoliated 2,000 acres (809.4 ha) of 6-year-old cottonwood plantations in just 3 days! A September survey indicated 16,500 acres (6,677.6 ha) of defoliation in Arkansas and Mississippi.

This tentmaker may be part of a problem which has recently appeared in Delta plantations. Crown thinning, dieback, and some tree mortality have occurred at several plantations. In some cases, mortality occurred in stands which had been defoliated by insect and/or disease agents the previous year. For example, a 1,400-acre (565.6 ha) plantation in Arkansas suffered fungal defoliation, in 1977. In spring 1978, many of the trees had thin crowns, with leaf clumps at the branch ends. By late June, many of these branches had died. However, the trees started growing and additional healthy leaves appeared. Then, in July, the trees were defoliated by poplar tentmakers. The 2 years of defoliation may kill some of the trees by the spring of 1979. Another effect of defoliation on cottonwood trees is reduced growth.

The sudden appearance of the poplar tentmaker as a new pest of cottonwood plantations, in September 1977, caused concern both to cottonwood growers and the Forest Service's Southern Hardwoods Laboratory. The scientists at the Stoneville, Miss., laboratory have been working with insect problems of intensively-cultured cottonwoods for several years and this was the first time that an insect problem of this magnitude had appeared. Even though little is known about the biology and impact of poplar tentmaker, the main concern of the growers is the need for effective control measures. Research will continue on this pest.

INTRODUCED PINE SAWFLY

Although introduced into New England in 1914, the introduced pine sawfly, *Diprion similis* Hartig, was discovered for the first time in the southern Appalachians, in 1977. A survey in 1978 showed this pest to be scattered over 160,000 acres (64,752 ha) in Burke and Avery Counties, North Carolina. The establishment of the sawfly in the Southeast is a matter of serious concern. Its favored host, white pine, is a major forest component in the Appalachian mountains of North Carolina, Virginia, Kentucky, Tennessee, and Georgia.

The potential damage to Christmas tree plantations is high. In addition, developed recreation areas, such as Linville Falls, may be threatened. These areas have high priority for control measures. Relatively little research has been done on the introduced pine sawfly in the United States. Moreover, virtually all studies have been in the Northeast, Midwest, and Lake States. The potential for serious impact under southern climatic and forest conditions is not known. Research on biology and host preference should be initiated. In addition, the introduction of parasites as biological control agents will be explored in 1979.

SEED ORCHARD INSECTS

Current reports indicate a general increase in cone damage, southwide, by coneworms, *Dioryctria* spp. during 1978 (figure 5). One industry orchard documented a 64 percent cone loss on unprotected trees. In addition, coneworms destroyed 34 percent of the cone crop on trees protected with carbofuran (10 percent granular) a granular systemic insecticide. Total losses on this orchard exceed $750,000. Data from two Forest Service Seed Orchards, the Stuart in Louisiana and the Erambert in Mississippi, show this progressive increase in cone losses (figure 6).

Conebeetles, *Conophthorus coniperda* (Schwartz) and coneborers, *Eucosma tocullionoma,* Heinrich, together caused a 34 percent loss to cones on untreated white pine trees at the Forest Service's Beech Creek Seed Orchard, Murphy, N.C. in 1978. Losses on carbofuran-treated trees were 7 percent. Cone losses from these two pests on southern orchards were generally lower than in past years.

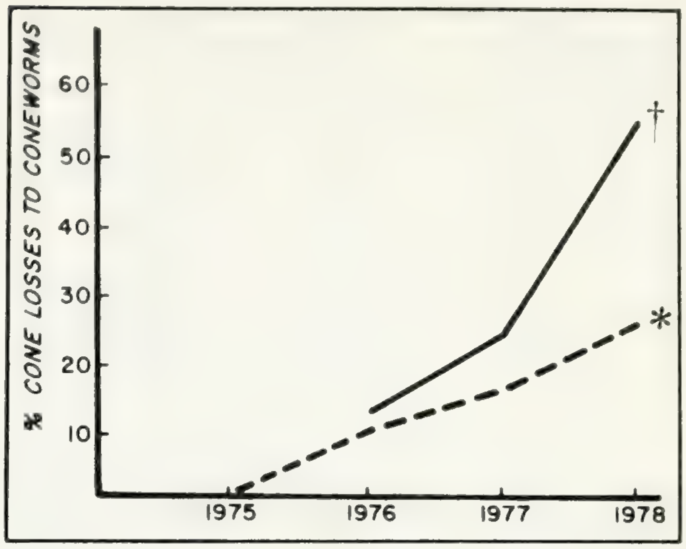
Populations of seedbugs, *Leptoglossus corculus* (Say) and *Tetyra bipunctata* (H.-S.), fluctuate seasonally and from area to area. No information on the general trend is available on seedbugs. However, year in and year out, these insects cause considerable losses. Evidence of the loss that can occur from seedbug feeding was the 3 percent sound seed on a check area, compared with 60 percent on a treated area on shortleaf pines at the Forest Service's

Ouachita Orchard in Arkansas, in 1977. Empty pine seeds averaged at 61.2 percent of the total seeds on untreated checks compared with 38.8 percent on trees treated with azinphos methyl or carbofuran on Federal seed orchards in 1977.

Acreage affected and treated during FY 78:

Seed Orchard	Total acreage	Producing acres	Acres treated with insecticide
Federal	1,293	731	731
State	2,643	1,321	1,321
Industrial	4,587	2,504	2,504
Total	8,523	4,556	4,556

Figure 6.—Cone losses from coneworms on untreated mature loblolly pines at the Stuart and Erambert Orchards in Louisiana and Mississippi, 1975-78.



†*Louisiana loblolly, Stuart Orchard, USDA Forest Service.*
**Southern Mississippi loblolly, Erambert Orchard, USDA Forest Service*

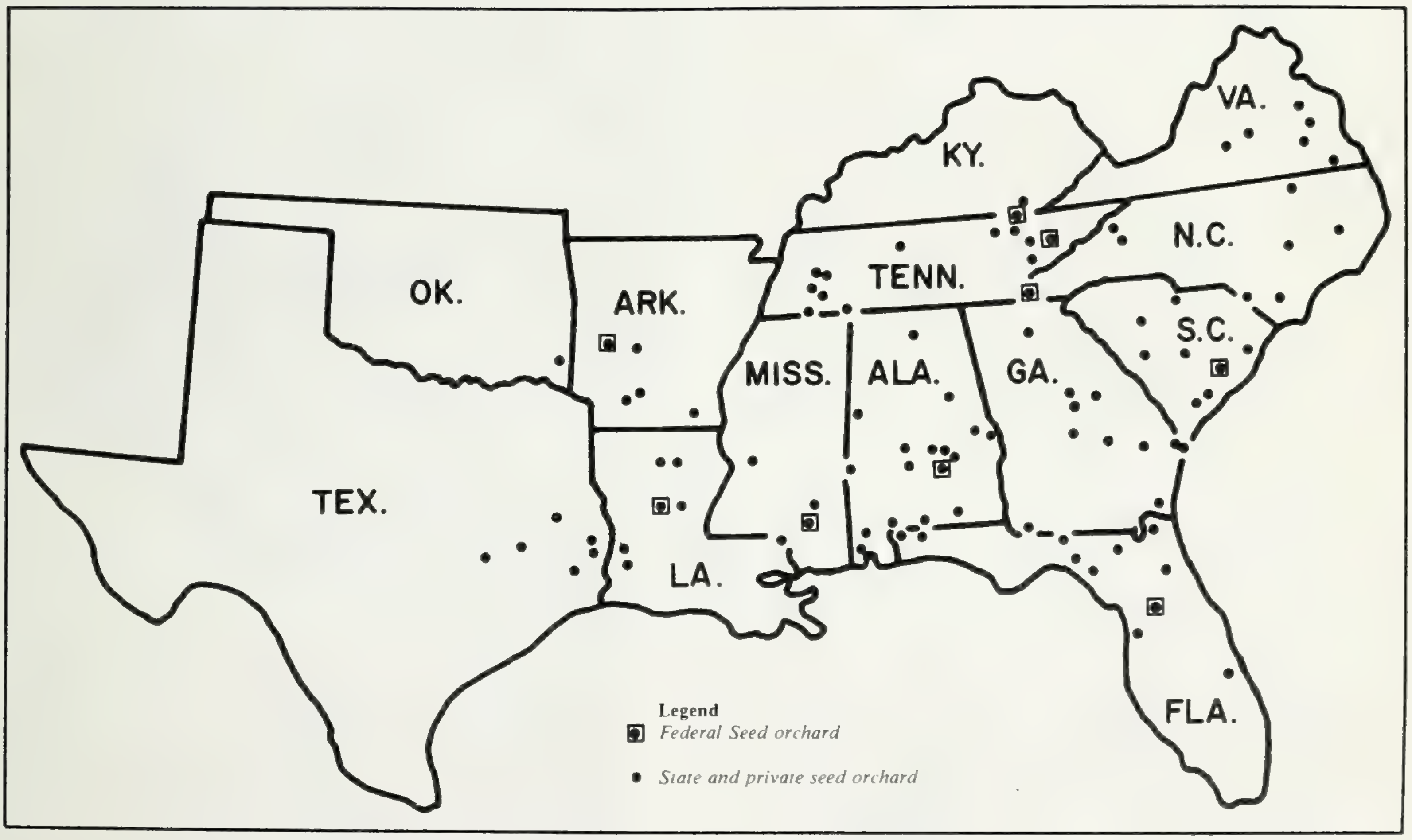


Figure 5.—Locations of Federal, State and private seed orchards in the South.

OTHER INSECTS

Defoliating Insects

Insect	Host(s)	Counties or States	Remarks
Arkansas pine sawfly, *Neodiprion taedae linearis* Ross.	Loblolly and shortleaf pine	13 western counties of Ky. (figure 7)	Defoliation was light (10 to 20 percent) in western Ky.
	Loblolly and shortleaf pine	Alamance, Caswell, Guilford, Person and Rockingham, N.C.	Defoliation was moderate to light in these piedmont counties of N.C.
Bagworm, *Thyridopteryx ephemeraeformis* (Haw.)	Arborvitae, eastern redcedar and white pine	Buncombe, N.C.	Defoliation by the bagworm was very heavy this year and, in some cases, mortality occurred in white pine plantations. Numerous sapling-sized shade trees were also lost to this insect.

Defoliating Insects (continued)

Insect	Host(s)	Counties or States	Remarks
Eastern tent caterpillar, *Malacosoma americanum* (F)	Black cherry	Fla., Ga., Ky., N.C., S.C., Tenn., Va.	Defoliation by this insect was heavy throughout the mountains of each of the States listed. Scattered locations of cherry were also heavily defoliated throughout the Piedmont and Coastal Plains of each State.
Elm leaf beetle, *Pyrrhalta luteola* (Mueller)	Elm	Ky., N.C., Tenn., Tex.	Defoliation increased again this year to almost outbreak proportions.

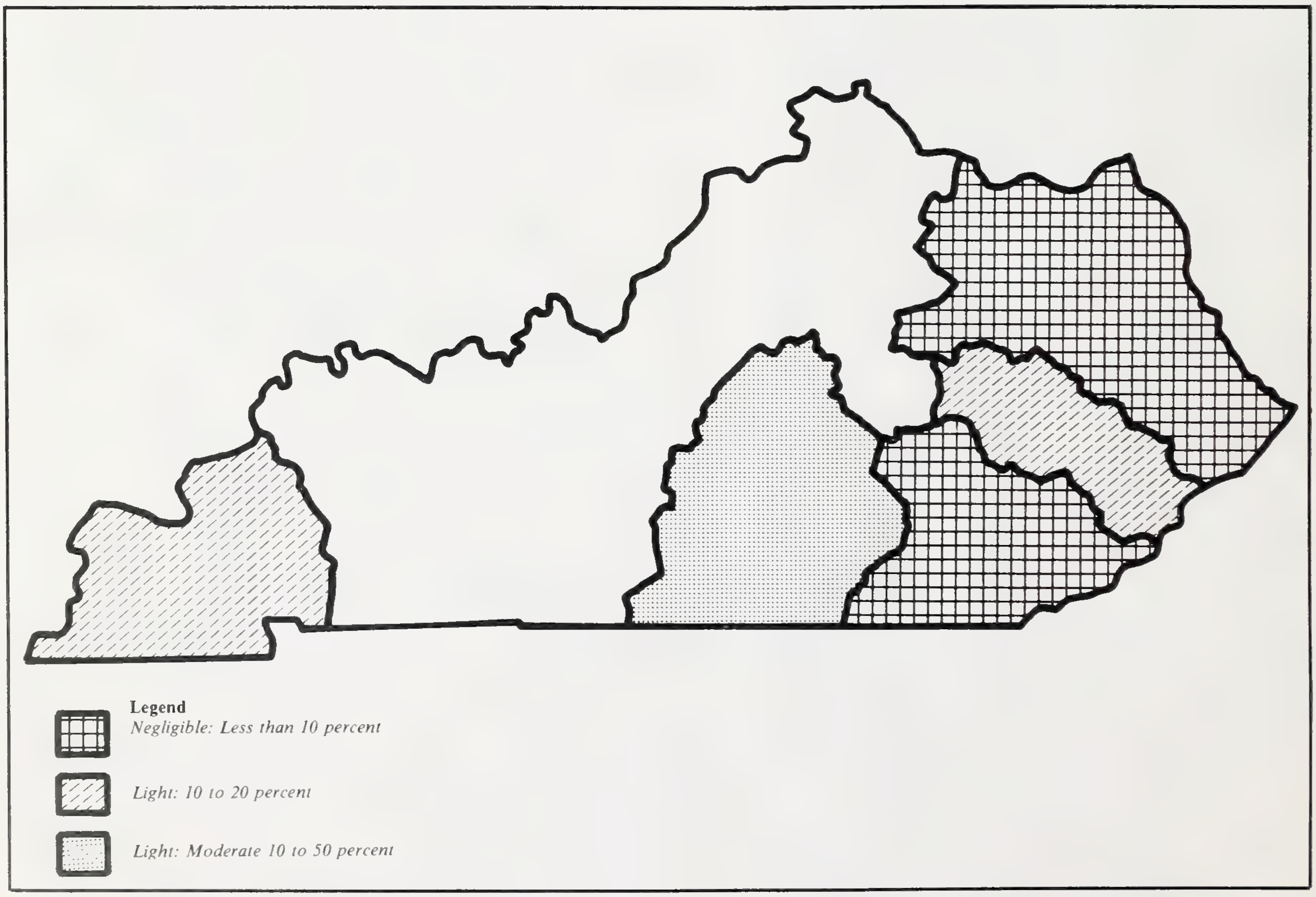

Legend
Negligible: Less than 10 percent
Light: 10 to 20 percent
Light: Moderate 10 to 50 percent

Figure 7.—Virginia and Arkansas pine sawfly defoliation in Kentucky.

Defoliating Insects (continued)

Disease	Host(s)	Counties or States	Remarks
Forest tent caterpillar *Malacosoma disstria* Hbn.	Tupelo gum, blackgum, sweetgum, and various species of oak.	Baldwin, Clarke, Mobile, Washington, Ala. Ascension, Assumption, Iberville, Lafourche, Livingston, St. James, St. John the Baptist, St. Mary, Tangipahoa, Terrebonne Parishes, La.	This insect defoliated over 50,000 acres in Ala., and 700,000 acres in La. Defoliation has occurred in the gum-tupelo swamps of both states for the past 15 years, without economic effect.
	Tupelo gum, blackgum, sweetgum, and various species of oak	Gates, N.C.	The forest tent caterpillar defoliated 250 to 300 acres in the Dismal Swamp Wildlife Refuge.
Gypsy Moth, *Porthetria dispar* (L.)	Oak	Blount, Sevier, and Wilson, Tenn.	Male moths trapped, one each in Sevier and Wilson and two in Blount.
	Oak	Avery, N.C.	Trapping of seven and nine males per trap reveals a probable established infestation in Avery County. This infestation, if present, will be treated by USDA's APHIS in the spring of 1979.
	Oak	Accomac, Clark, Fairfax, Loudon, and Prince William, Va.	Male moth pheromone traps in Virginia showed the following multiple catches:* Accomac-14 in 14 traps Clark-28 in 21 traps Fairfax-31 in 21 traps Loudon-162 in 133 traps. Prince Williams-13 in 13 traps. An infestation became established in Loudon County and will be sprayed by APHIS, next spring.
Hackberry butterfly *Asterocampa celtis* (Bdv. and LeC.)	Hackberry and sugarberry	Desha, Ark., Bolivar, Claiborne, Coahoma, Issaquena, Warren, and Washington, Miss.	Defoliation of sugarberry was reported along the Mississippi River from Port Gibson north to Rosedale, Miss. Defoliation was light in most counties and heavy in a few.

Defoliating Insects (continued)

Disease	Host(s)	Counties or States	Remarks
Locust leaf-miner, *Odontota* (=*Xenochalepus*) *doralis* (Thumb.)	Black locust	Ky., N.C., Tenn., Va.	Heavy locust leaf miner populations caused severe defoliation throughout Ky., and Va with scattered severe damage in N.C. and Tenn
Oak sawfly, *Caliroa* spp.	Red oak	Ky., N.C., Tenn., and Va.	Infestations by this insect declined drastically in 1978
Orange striped oakworm, *Anisota senatoria* (A. and S.)	Cherry-bark oak seedlings	Tenn.	Defoliated 3 acres of cherrybark seedlings in Tenn
Shortleaf pine looper, *Anacamptodes vellivolata* (Hulst)	Shortleaf and loblolly pine	Anderson, Cherokee, Houston, Nacogdoches and Polk, Tex.	This insect extensively defoliated shortleaf pine. Loblolly pine was also defoliated when intermingled with shortleaf. Although about 25,000 to 50,000 acres were defoliated, only 1,500 to 2,000 acres were heavily defoliated.
Variable oak leaf caterpillar, *Heterocampa manteo* (Dbldy.)	Oak	Grant Parish, La.	In La., 100 percent defoliation occurred on 100 acres of forested land.
	Oak	Calhoun, Grenada, and Lee Miss.	The caterpillar defoliated various oaks species in northern Miss.
	Oak	Halifax and Northampton, N.C.	The variable oak leaf caterpillar moderately defoliated numerous oaks in N.C.
Virginia pine sawfly, *Neodriprion pratti pratti* (Dyar)	Virginia pitch, jack, shortleaf, loblolly and red pines	56 counties in southeastern Kentucky (figure 7)	Defoliation by this insect was light to moderate.

Defoliating Insects (continued)

Disease	Host(s)	Counties or States	Remarks
Walkingstick, *Diapheromera femorata* (Say)	Black oaks and wild cherry preferred, but feed on many other hardwoods	Garland, Montgomery, Perry, Polk, Scott, and Yell, Ark.; and Le Flore, Okla.	This insect had defoliated 18,840 acres in Ark. and Okla. Defoliation here has occurred for the past 2-3 years with little economic effect.
	Black oaks and wild cherry preferred, but feed on many other hardwoods	Greene, Madison, Page and Warren, Va.	Defoliation in Va. was moderately heavy in Warren and Page Counties and moderate, with occasional heavy spots, in Madison and Green Counties. The walkingstick defoliated 3,498 acres of the Shenandoah National Park and 2,140 acres of private lands.

Inner Bark Boring Insects

Insect	Host(s)	Counties or States	Remarks
Black turpentine beetle, *Dendroctonus terebrans* (Oliv.)	Pine	Grant Parish, La; Wilkinson and Amite, Miss.; counties throughout east Tex.	During the early and late fall, turpentine beetle populations were a minor problem in longleaf stands on the Catahoula Ranger District, Kisatchie National Forest, La.; also in ranger districts on the Homochitto National Forest, Miss., and throughout east Tex.
	Pine	Dodge, Telfair, Treutlen, and Wheeler, Ga.	Black turpentine beetle activity in Ga. has increased during the late summer and fall because of dry weather.
Ips beetle, *Ips* sp.	Pine	Grant Parish, La.; Scott, Smith, Miss.; McCurtain, Okla; and counties throughout east Tex.	Ips beetles caused moderate timber losses on the Tiak Division, Ouachita National Forest, Okla. and Bienville National Forest, Miss. Scattered single, and small, multiple tree spots were common in east Tex. and La.

Inner Bark Boring Insects (continued)

Disease	Host(s)	Counties or States	Remarks
Ips beetle (continued)	Pine	Florida	A statewide survey in Florida showed that about 200,000 cords were lost to Ips bark beetles.
	Pine	Edgefield, Greenwood, and McCormick, S.C.	Ips beetles in S.C. accounted for the loss of 350 cords and 120,000 board feet of sawtimber.
	Pine	Dodge, Telfair, Treutlen, and Wheeler, Ga.	Surveys in Ga. showed 1,537 spots containing losses of 2,453 cords and 7,000 board feet. Beetle activity increased in 1978 because of extremely dry weather.
	Pine	N.C.	In N.C., spots were scattered throughout the Piedmont and Coastal Plains.

Bud, Twig and Seedling-damaging Insects

Insect	Host(s)	Counties or States	Remarks
Nantucket pine tip moth, *Rhyacionia frustrana* (Comstock)	Loblolly pine	Bleckley, Decatur and Montgomery, Ga.	Severe tip moth damage occurred in 3-5 year old loblolly pine plantations in Ga. Mortality was 5 to 10 percent in some plantations of Bleckley and Montgomery; each county had about 250 acres damaged. Heavy damage also occurred in a 40-acre plantation in the Meeman-Shelly State Park seed orchard.

Wood-boring Insects

Insect	Host(s)	State	Remarks
Banded hickory borer, *Knulliana cincta* (Drury) Red oak borer, *Enaphalodes rufulus* (Hald.) (= *Romaleum rufulum*) Sugar maple borer, *Glycobius speciosus* (Say) Twolined chestnut borer, *Agrilus bilineatus* (Web) White oak borer, *Goes tigrinus* (DeG)	Northern red oak, scarlet oak, southern red oak, black oak, red maples, hickory	Ky.	In Ky., wood borers of oak, maple and hickory damaged 14,316,725 cubic feet of timber
Columbian timber beetle, *Corthylus columbianus* Hopk.	Yellow-poplar, hard pines	Ky.	This beetle accounted for 14,918,326 cubic feet of damage to yellow-poplar and hard pines.

Root-feeding Insects

Insect	Host(s)	State	Remarks
Pales weevil, *Hylobius pales* (Herbst.)	Southern pine seedlings	Ga.	Seedlings treated with pesticide for prevention of pales weevil attack were offered by the N.C. Forest Service to private landowners; however, a survey showed that 4 percent of the seedlings are still being lost to this insect. See figure 8.

Sap-sucking Insects

Insect	Host(s)	States	Results
Balsam woolly aphid, *Adelges piceae* (Ratz.)	Fraser fir	N.C. and Tenn	Continues to spread into the remaining Fraser fir stands in N.C. and Tenn. Control efforts continued this year on 160 acres of the Roan Mountain scenic area, Toecane Ranger District, Pisgah National Forest, N.C. The balsam woolly aphid has also become a problem in Avery and other western N.C. counties where Christmas tree plantations are near infected natural Fraser fir stands.

Pales weevil

STATUS OF DISEASES

ANNOSUS ROOT ROT

Fifteen to 20 years ago, annosus root rot, caused by the fungus *Fomes annosus* (Fr.) Cke., was viewed as an overwhelming threat to southern pine management. However, losses have not reached their expected level, southwide. Two main reasons account for this situation. First, we have learned that trees on different sites vary in their susceptibility. Secondly, the reduced number of thinnings, the use of borax and summer thinnings below the 34 degrees N latitude in some areas have reduced the disease occurrence (figure 9).

In Virginia, the small number of high hazard sites and a reduction in thinnings has kept losses to a minimum. However, in South Carolina and Georgia, losses in local areas have been high. A 2-year drought and first thinnings with no protective stump treatments have both contributed to the high incidence of annosus root rot in these areas. On the Oconee National Forest, an outbreak in a 22-year-old loblolly plantation followed the familiar pattern. The stand was thinned about 5 years ago and no stump treatment was utilized. This year, trees began to die. The stand had significant infection, with numerous fruiting bodies on stumps and trees.

Managers faced with this problem get little comfort from the fact that annosus is not as widespread as once feared. Even though localized, it can cause a significant impact on management in some stands for many years.

Annosus root rot can decline without completely destroying a stand or at least reducing its stocking to below minimum levels. This decline may have occurred in several plantations at the Savannah River Plant south of Aiken, S.C. Observations in the summer of 1978 showed that mortality and the production of fruiting bodies were both negligible. These observations are in sharp contrast to conditions 6 years ago when fruiting and mortality were quite high in the same stands.

Unfortunately, the manager cannot depend on a decline in severity of annosus root rot in infected stands. More often, the disease causes a change in

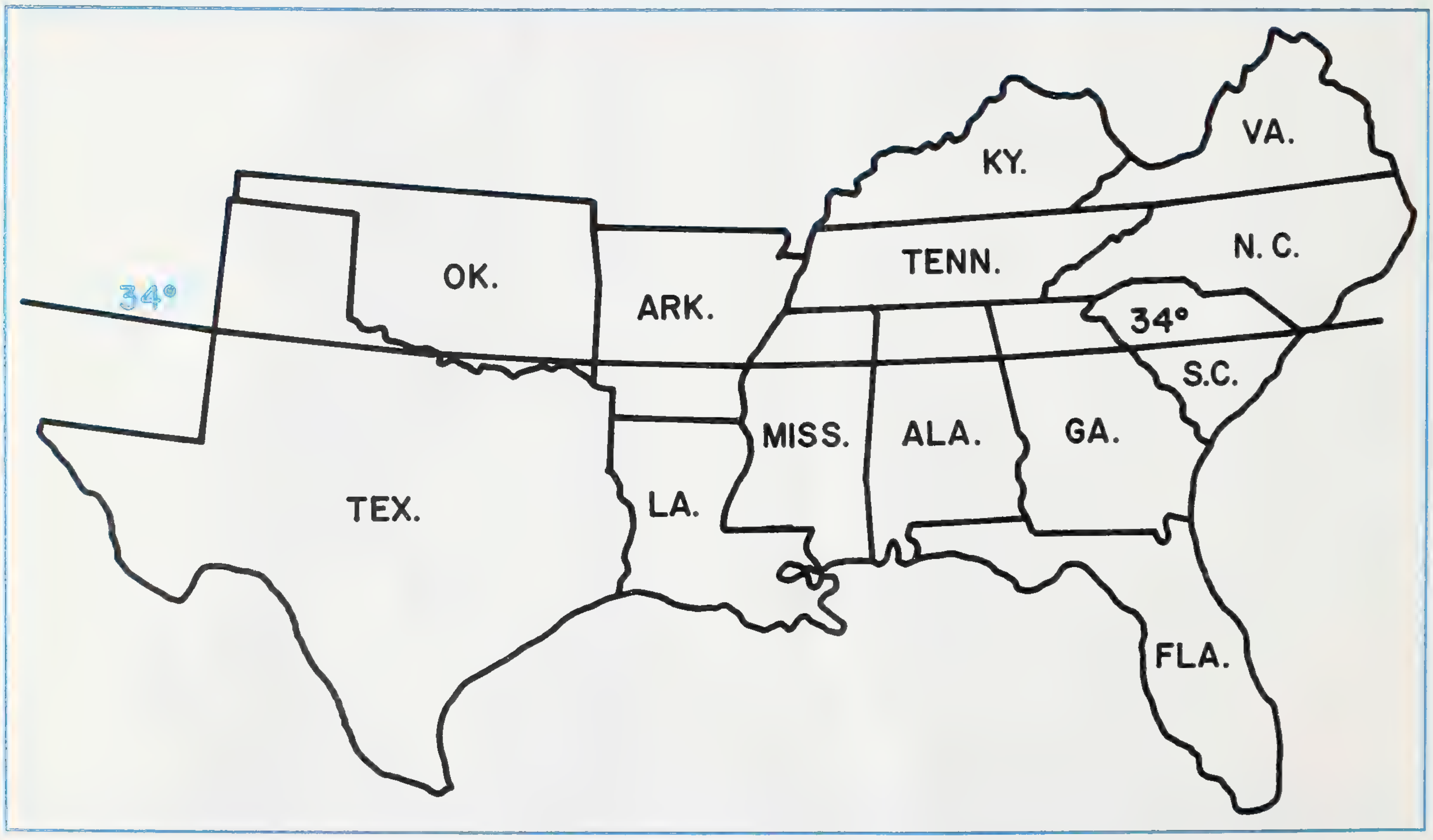


Figure 9.—In locations below the 34 degrees N latitude, summer thinning can be used to reduce annosus root rot.

management alternatives before it runs its course. As a result, the Southeastern Area's Forest Insect and Disease Management staff is reviewing its efforts to inform managers of the alternative of using borax at the time of the first thinning, especially on high hazard sites. Although the technique is fairly simple, it is not yet being utilized to full advantage.

FUSIFORM RUST

It was rare to find fusiform rust, caused by *Cronartium fusiforme* Hedge and Hunt ex Cumm, in the South before 1900. Since then, the disease has increased in intensity, distribution and impact throughout the area (figure 10). This increase has closely coincided with the increase in plantation management.

This disease is most severe in a wide, land corridor from central Louisiana through Florida, and in parts of Texas, Arkansas, and Virginia. It limits the establishment and management of loblolly and slash pine throughout most of this highly vulnerable area. Fusiform rust incidence varies, but was shown to increase 2-3 percent per year in 17-year-old slash pines in Florida and Georgia. A 1952 estimate places the annual loss to fusiform rust at 97 million cubic feet (2.7 million m^3) of growing stock, including 281 million board feet of sawtimber. A 1972 survey showed that about 109 million cubic feet (3.1 million m^3) are lost to fusiform rust annually.

This disease is most damaging where susceptible pines are planted offsite. One example is slash pine planted on longleaf pine sites in central Louisiana.

A 1978 survey in five parishes of central Louisiana showed an average of 37 percent stem cankering on 20 slash pine plantations, and rust mortality at 14 percent. Louisiana State University reported in 1977 that stem cankering ranged from 21-51 percent in their 15-year-old loblolly pine plantations.

Because approximately 1 million acres (404,700 ha) of susceptible pine are being planted each year we would expect the damage to increase. However, losses may be reduced through integrated pest management strategies outlined in the *Management of Fusiform Rust in Southern Pines Symposium Proceedings, 1977.* These strategies combine rust resistance and silvicultural practices that work together to reduce fusiform losses. A chart presented in the symposium will help the land manager make decisions on removing and thinning infected stands (figure 11).

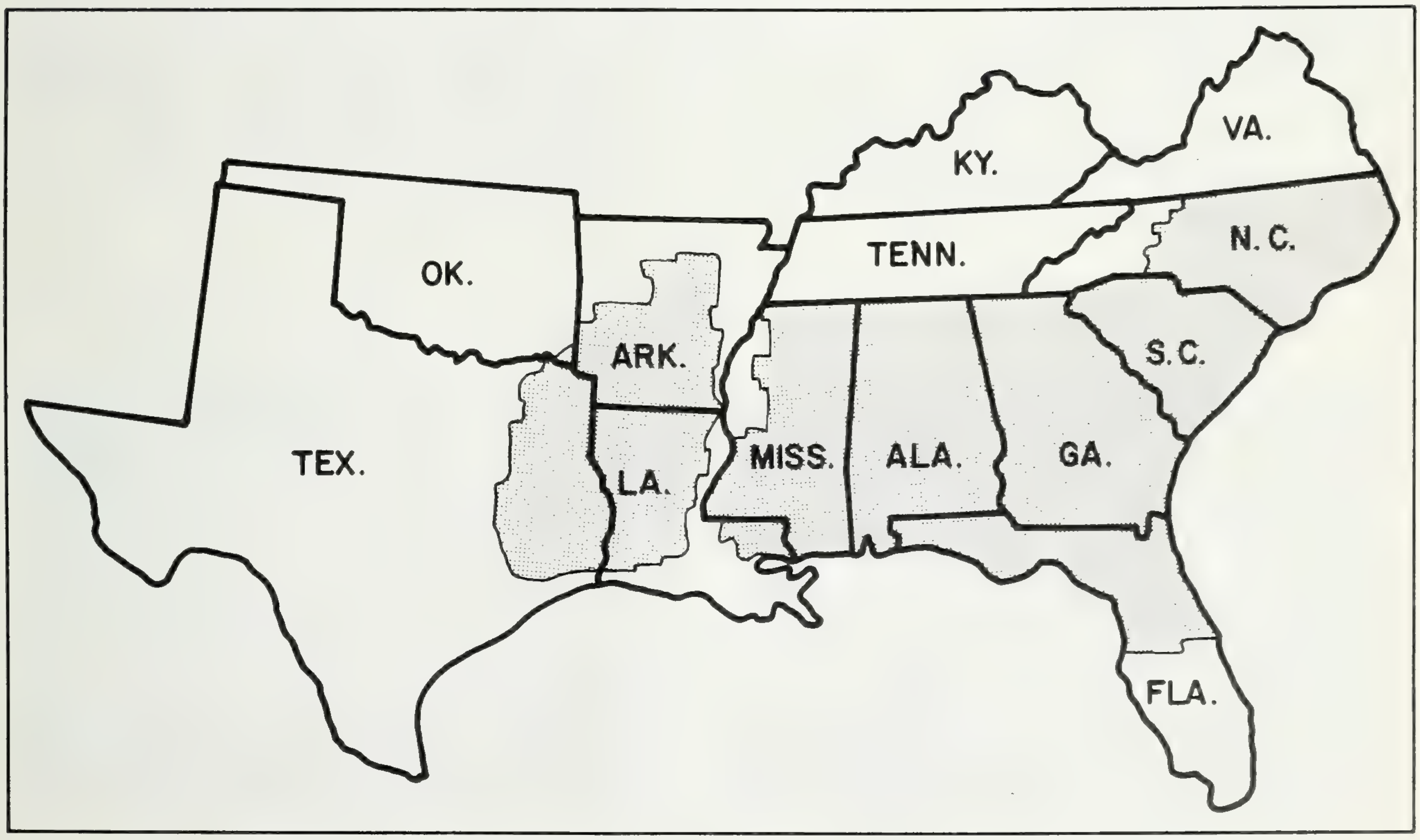


Figure 10.—Approximate range of fusiform rust in 8- to 12-year old loblolly and/or slash pine plantations from North Carolina to Texas.

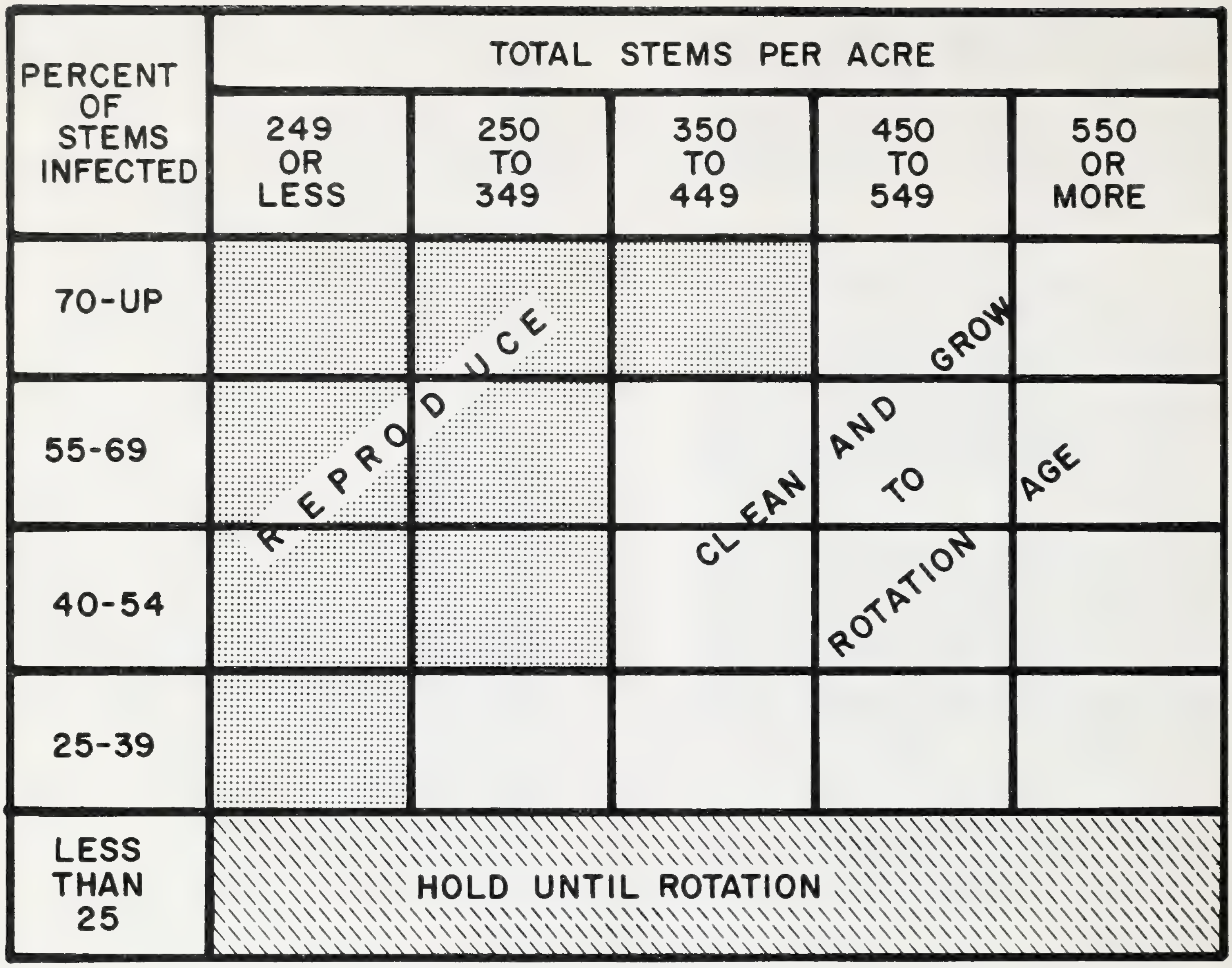


Figure 11.—A chart to help land managers make decisions on removing and thinning infected stands. (From *Management of Fusiform Rust in Southern Pines Symposium Proceedings, 1977)*

PITCH CANKER OF PINES

Pitch canker, caused by *Fusarium moniliforme* var. *subglutinans,* is a cyclic disease which causes substantial deformity, growth loss and mortality in slash and Virginia pine stands. Shortleaf, scotch, table mountain, pitch, loblolly and sand pine are also susceptible. Most of the severely affected stands are in Florida and southern Georgia, but the disease does occur over a wide range (figure 12).

In Florida, pitch canker was first noticed in 1972, and had increased slightly by 1973. In 1974, the disease increased in Volusia and Putnam Counties. Up to 100,000 acres (40,470 ha) were affected, with the number of stems infected per stand as high as 85 percent. In 1975, pitch canker intensified and caused the premature harvesting of several hundred acres. A 1976 survey of Federal land in Florida showed that the only forest with enough pitch canker to be concerned about was the Apalachicola. The disease was found in 11- to 16-year-old slash

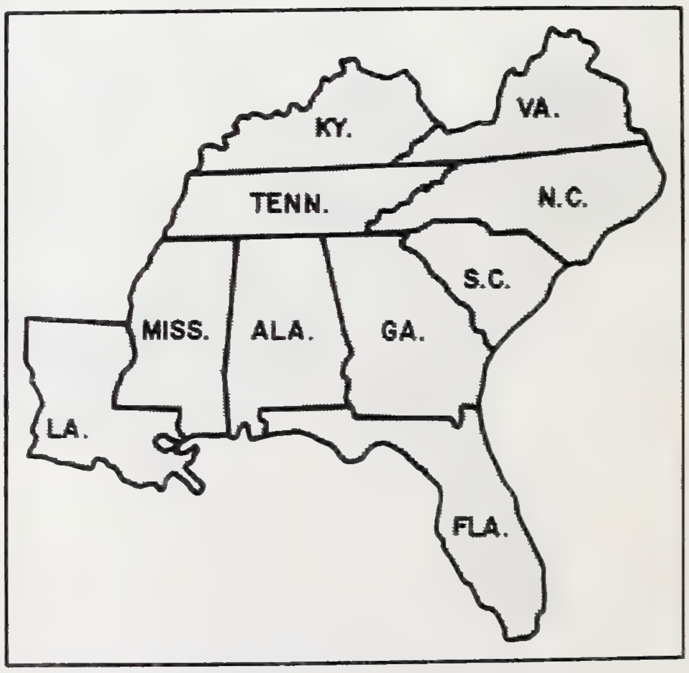


Figure 12.—States in which pitch canker has been reported in 1978.

pine with an average of 33.6 percent of the trees infected per stand. A 1978 survey of the same forest showed that the infected slash pine stands were 11-19 years old with an average of 25 percent of the trees infected per stand. Overall, the number of stands with enough infection to affect management has been reduced, but the distribution and number of stands with between 5 and 10 percent infection has increased. This increased occurrence will contribute to future losses that may be expected when proper conditions for an epidemic occur.

Recently, pitch canker has been causing substantial damage in seed orchards. The affected trees are from pitch canker susceptible families. The disease is normally associated with mechanical damage.

NURSERY DISEASES

Root Rots

Charcoal or black root rot, caused by *Macrophomina phaseolina (Sclerotium bataticola)* Tabu. (Davis) and *Fusarium* spp., caused widely scattered and locally severe damage to several pine species in widespread southern nursery locations during 1978 (figure 13). The most severe damage occurred in a Georgia State nursery involving several million loblolly and slash pines. Charcoal root rot also severely damaged seedlings in an Oklahoma State nursery where approximately 30,000 1-0 Austrian pines have been killed or rendered unsalable. The disease has also caused noticeable seedling losses, but minor losses in other nurseries in Georgia as well as in South Carolina, Louisiana and Kentucky. This is the first reported occurrence of charcoal or black root rot in pine seedling samples collected from the Morgan County (eastern Kentucky) State nursery in July.

Cylindrocladium root rot, caused by *Cylindrocladium scoparium* Morgan and *C. floridanum* Sobers & Seymour, continues to cause local, severe damage to a variety of hardwood seedling species in southern nurseries. *C. scoparium* has been detected in association with root rot, stem canker, and foliage necrosis and discoloration on eucalyptus in both a State nursery and field plantings in south Florida. *C. floridanum* was repeatedly isolated from damaged 1-0 sweetgum seedling roots at the West Virginia Paper Company Nursery near Summerville, S.C. Scattered mortality and stunting were observed throughout the 250,000 sweetgum seedling crop (figure 14). *C. scoparium* was also detected in seedbeds involving several thousand damaged black walnut seedlings at the Baucum State Nursery in Arkansas.

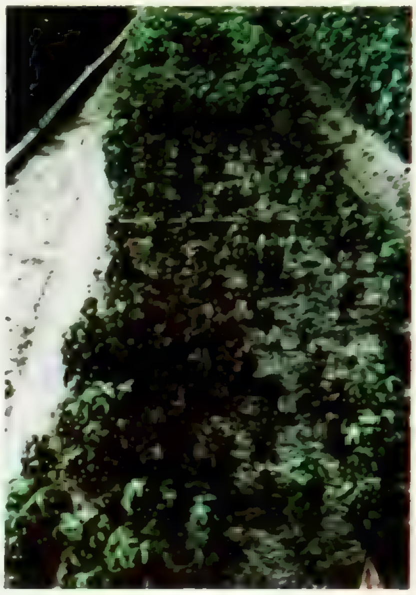


Figure 14.—Cylindrocladium root rot symptoms and damage on 1-0 sweetgum seedlings in a South Carolina industry nursery.

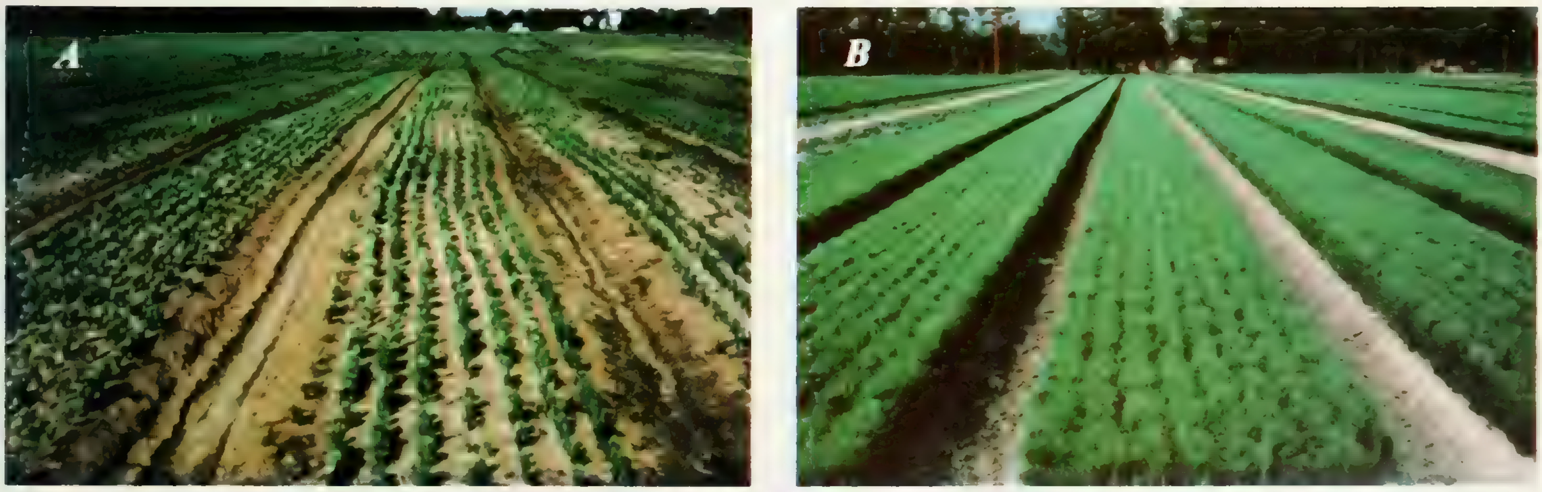


Figure 13.—*A,* Charcoal root rot symptoms and damage on 1-0 loblolly pine seedlings in a Georgia State nursery; *B,* apparently disease-free 1-0 slash pine in a Florida State nursery where charcoal root rot was a severe problem in 1976.

Phytophthora and pythium root rots, caused by several species of *Phytophthora* and *Pythium,* continue to cause seedling losses in widespread southern nurseries. Phytophthora root rot damage is again severe (loss of more than 10 percent of approximately 500,000 seedlings) on Fraser fir at the Linville State Nursery in North Carolina. A high soil population (291 propagules per gram of soil) of a *Pythium* sp. was associated with a severe root rot involving approximately 3 million loblolly and slash pine seedlings in a Texas State nursery. A *Pythium* sp. and a *Phytophthora* sp. were both isolated from diseased black walnut roots along with the previously reported *C. scoparium* at the Baucum State Nursery in Arkansas. Consequently, all three of these soil pathogenic fungi may be contributing to the black walnut root rot problem at this nursery.

Soil fumigation with methyl bromide-chloropicrin formulations such as methyl bromide-67 percent + chloropicrin-33 percent and methyl bromide-98 percent + chloropicrin-2 percent, applied before seedlings are planted, continue to provide the most efficient and effective control of these root rot diseases in forest tree nurseries. The first formulation, with its increased chloropicrin concentration, is most effective against soil pathogenic fungi—particularly those such as *Cylindrocladium* with tough, resistant sclerotial propagules.

Fusiform rust, caused by *Cronartium quercuum* f. sp. *fusiforme,* was again at a low incidence (less than 1 percent average) in southern forest tree nurseries during 1978. Few problems are reported with fusiform rust primarily because of intensive ferbam fungicidal spray programs along with a late spring and hot dry weather that prevailed during the spring and early summer rust infection period. However, a 3 percent rust infection was observed on slash pine seedlings at the Munson State Nursery in western Florida, in July.

Foliage Diseases

A needle cast or foliage blight is again causing severe damage on 2-0 eastern white pine seedlings at the Edwards State Nursery in western North Carolina. Laboratory examination of diseased white pine foliage along with foliage and root tissue isolations have consistently revealed the foliage fungus *Pestalotia* sp. and the soil fungus *Fusarium* sp. as the most probable causes of this problem. Over 50 percent of the 1978 white pine seedling crop (3-4 million seedlings) at the Edwards nursery have been severely discolored and defoliated (figure 15).

Protective foliage fungicidal sprays effectively controlled the disease on the foliage of 2-0 eastern white pine seedlings in several southern nurseries during the past years. Control treatments were modified at the Edwards Nursery during 1978—thereby resulting in the reoccurrence of the extensive and severe disease symptoms on white pine foliage.

A severe foliage disease was also observed on 1-0 loblolly pine primarily in one localized seedbed section at the new Champion International industry nursery in east Texas. Approximately 9,000 loblolly pine seedlings were damaged in two seedbeds. The causal agent(s) for this unusual problem is under study by the Southern Forest Experiment Station and by the Southeastern Area's Forest Insect and Disease Management Staff at Pineville, La.

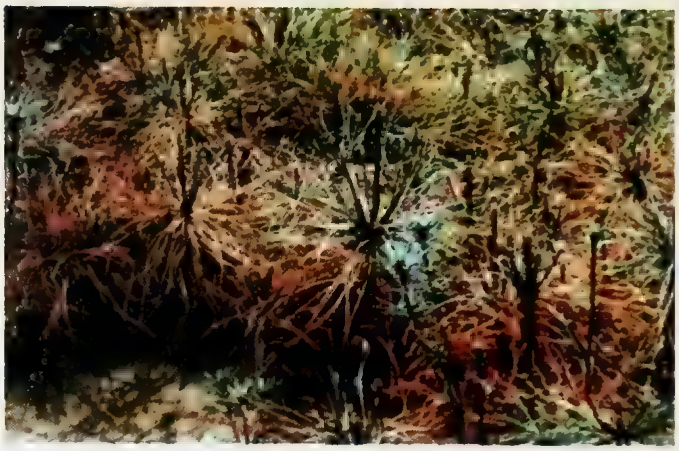


Figure 15.—Needlecast or foliage blight symptoms and damage on approximately 3 to 4 million 2-0 eastern white pine seedlings in a western North Carolina State nursery.

Phomopsis blight, caused by *Phomopsis juniperovora* Hahn, has severely damaged foliage on eastern redcedar and Arizona cypress at the Miller State Nursery near Montgomery, Ala. Approximately 10,000 redcedar and 3,000 Arizona cypress were rendered unsalable by the disease. Foliar fungicidal sprays with Benlate represents the most effective control for this disease problem.

OTHER DISEASES, DROUGHT AND DEER DAMAGE

Disease	Host(s)	Counties or States	Remarks
Brown spot, *Scirrhia acicola* (Dearn.) Sigg.	Longleaf and slash pines	Ala., Fla., La., Miss.	Light damage in most areas with severe losses in localized stands.
Comandra rust, *Cronartium comandrae* Pk.	Loblolly	Bledsoe County, Tenn.	Twenty percent of the trees in a stand were killed.
Diplodia tip blight, *Diplodia pinea* (Desm.) Kickx.	Scotch pine	Elizabeth County, Ky.	Branch dieback.

Disease	Host(s)	Counties or States	Remarks
Eastern gall rust, *Cronartium quercuum* (Berk.) Miy ex Shirai	Virginia pine	Bedford County, Va	Light damage
Littleleaf, *Phytophthora cinnamomi* Rands	Shortleaf pine	Ky., Tenn	Decline on several thousand acres
Pine needle rust, *Coleosporium* sp.	Hard pines	Throughout south	Little damage, but widespread
Sweet fern blister rust, *Cronartium quercuum* (Berk.) Mi. ex Shirai	Virginia and loblolly pines	Va.	Little damage except in droughty areas
White pine blister rust, *Cronartium ribicola* Fisch.	Eastern white pine	N.C., Va.	Low throughout known range. A 1978 survey showed infection remains low in parts of Va even though ribes eradication had been stopped
White pine needle fall (cause unknown)	Eastern white pine	Mountains of N.C.	Needles turned brown and dropped, in 1978.
White pine root decline, *Verticicladiella procera* Kend.	Eastern white pine	Dawson, Ky.	Scattered dying of white pine, primarily on wet sites
Winterkill	Loblolly, shortleaf, and Virginia pine	Hedglin, Eabill, and Harris counties, Va.	Severe growth loss with low mortality.
Actinopelete leaf spot, *Actinopelte dryina* (Sacc.) Hoehn.	Red oaks	From Ark. to Va.	Especially severe on pin oak.
Decay, primarily fungi in the Polyporaceae	All species	Throughout South	Causes about 80 percent of the insect and disease losses Included as a pest of lesser importance because of few field reports.
Hypoxylon canker, *Hypoxylon atropunctatum* (Schw. ex Fr.) Cke.	Red oak group	Ga., N.C., S.C., Tenn.	Scattered mortality in weakened trees

Insect	Host(s)	Counties or States	Remarks
Oak anthracnose, *Gnomonia quercina* Kleb	Red and white oaks	N.C. Va.	Defoliation was light to moderate, especially in the mountains
Oak decline (cause unknown)	Oak	Ark. La. Miss. N.C. Tex.	Scattered throughout oak range in 1978
Oak leaf blister, *Taphrina caerulescens* (mont. & Desm.)	Red oaks	Fla., Ga., Ky., N.C., S.C., Tenn	Scattered throughout range, but not severe enough to cause defoliation
Oak wilt, *Ceratocystis fagacearum* (Bretz) Hunt	Oak	Throughout known range of oak wilt (see figure 16)	Several new infection centers were found throughout the range; the disease remains endemic
Powdery mildew, *Microsphaera alni* DC. ex Wint.	Oak	Fla.	No damage
Root rots, *Armillaria mellea* Vahl. ex Fr. *Clitocybe tabescens* (Scop. ex Fr.) Bres. *Polyporus schweinitzii* Fr. *Phytophthora* sp.	All species	Throughout South	Mortality was light overall, but caused losses as high as 50 percent in individual stands

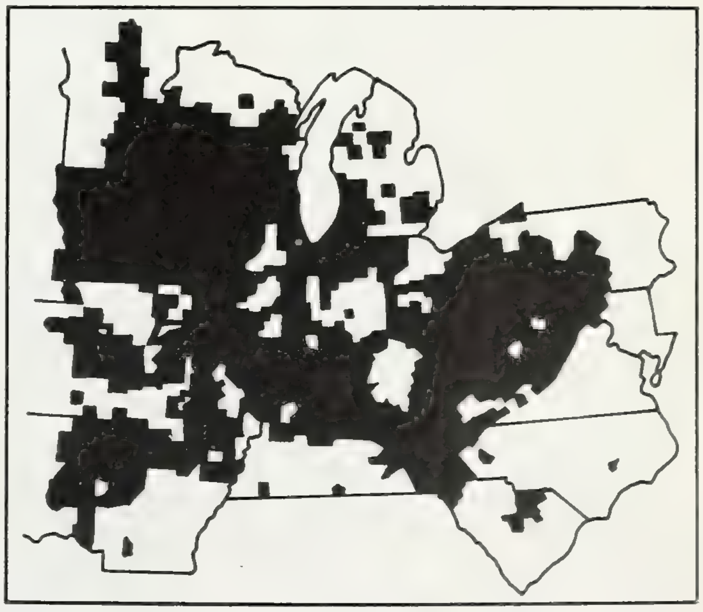


Figure 16.—Reported distribution of oak wilt in the United States, by State, 1976.

Insect	Host(s)	Counties or States	Remarks
Slime flux; *Erwinia nimipressuralis* Cart.	Oak	Ga., Ky., N.C., S.C., Tenn., Va.	About .1 percent of the oaks seem to be affected; usually associated with decay or an injury.
Eucalyptus leaf diseases, *Gleosporium* sp., *Cylindrocladium scoparium* Morg., *Alternaria* sp. *Pestalotia* sp.	Eucalyptus	Fla.	Damage under field conditions was very light.
Tar spot, *Rhytisma acerinum* Pers. ex Fr.	Maple	Fla., Ga. N.C.	No damage to host.
Black knot, *Dibotryon morbosum* (Schw.) Th., and Syd.	Black cherry	Ark., Ga., Ky., N.C., S.C., Tenn.	Light to severe losses reported. May limit species development in some locations, e.g., parts of S.C.
Butternut canker, *Sirococcus* sp.	Butternut	Ark., to Va.	Most of the sapling and larger trees are dead or infected.
Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Mor.	Elm	Ala., Ark., Ga., Ky., La., Miss., N.C.[1] S.C.[2] Tenn.[3]	Up to 80 percent losses have occurred in old infected areas while other areas have just lost the first tree.
Chestnut Blight, *Endothia parasitica* (Murr.) P.J. and H.W. And.	American chestnut	Throughout chestnut range.	Almost complete mortality of older trees. The hypovirulent strains give hope that the disease may be controlled.
Walnut anthracnose, *Gnomonia leptostyla* (Fr.) Ces & de Not.	Black walnut	Throughout walnut range	Moderate to complete defoliation occurred in August.
Melampsora rust, *Melampsora medusae* Thum.	Poplars	Throughout poplar range	Caused premature defoliation of the species except in resistant species.
Sycamore anthracnose, **Gnomonia** *platani* Edg.	American sycamore	Throughout range of sycamore	Most sycamores were severely defoliated. Branch dieback was common, but mortality was low.
Mimosa wilt, *Fusarium oxysporum* (Schl.) em. Snyd. and Hans.	Mimosa	Fla., Ga., N.C., S.C.	Has killed many trees. Resistant trees are taking the place of non-resistant trees through planting.
Fusarium canker, *Fusarium solani* (Mart.) App. & Wr. em. Snyd. and Hans.	Yellow-poplar, black walnut	Tenn.	Caused up to 50 percent losses in grafted seed orchards.
Drought	Maple, oak, poplar and chestnut	Throughout the area	Caused wilting and leaf fall of many trees, and death of severely stressed trees.
Deer damage	Pine	N.C.	Caused high losses in eastern N.C.

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[1] *One county.*

[2] *Sixteen counties.*

[3] *Seven counties.*

MYCORRHIZAE

Background

A nationwide evaluation of the potential applications of a fungus that helps improve the survival and growth of tree seedlings is being coordinated from the Asheville Field Office of the Southeastern Area, State and Private Forestry. Unlike most fungi studied by forest pathologists, the species in this evaluation are beneficial organisms. Although these fungi occur naturally in many forest soils, they are lacking, or exist in sufficient quantity to be helpful, in some soils. They can be produced in the laboratory and used to inoculate nursery beds. A commercially-produced inoculum is also being tested. The status of the nursery trials with fungi from the laboratory and commercial sources is given below. The fungi used in these trials are known to forest pathologists, but may not be recognized by those in other disciplines in forestry.

Briefly, the fungi grow on or in the roots of a tree, depending on the species of fungi. The roots take up more water and nutrients, and grow more vigorously than roots that lack these fungi. Many of the most important species of trees develop this mutually beneficial relationship with the fungi. Preliminary tests indicate there may be substantial gains in survival and growth of seedlings in both the nursery and in outplantings. Therefore, their potential is being tested under actual field conditions as well as in the laboratory.

Unlike other sections of this publication, some of the results presented in this section pertain to 1977; some of the results of corresponding work in 1978 will be compiled in 1979.

Nursery Evaluation: 1977 Results

The cooperative *Pisolithus tinctorius* (pers.) Cok & Couch ectomycorrhizae nursery evaluation involves nine coniferous host species in 16 nurseries in 14 states. The most recently available results are summarized in figure 17. Note the significant increases of ectomycorrhizae formulation and seedling fresh weights by the Mycorrhizal Institute's (Ga.) *P. t.* inoculum over the controls and a corresponding, significant decrease in the seedling cull percentage.

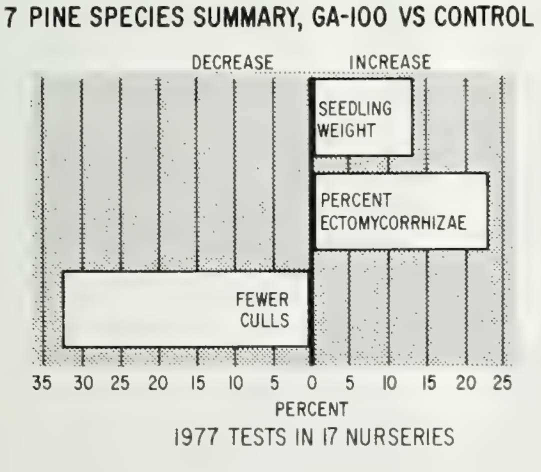


Figure 17.—Summary of 1977 *Pisolithus tinctorius* national evaluation in 16 nurseries on seven species of pines.

Overall, the best results were from the laboratory of the Mycorrhizal Institute, Southeastern Forest Experiment Station at Athens, Ga. The Institute's inoculum was superior to a commercial inoculum in the formation of *P. tinctorius* ectomycorrhizae on seedlings. The Institute's inoculum also resulted in better seedling quality and growth responses. Seedbed inoculations with the Institute's inoculum caused an average of 24.8 percent *P. tinctorius* ectomycorrhizal formation. Corresponding positive seedling growth and quality responses were also obtained, with a 14 percent increase in seedling fresh weights and a 32 percent decrease in seedling culls as compared with uninoculated check plots.

Similar seedbed inoculations with the commercial inoculum caused an average of 4.2 percent *P. tinctorius* ectomycorrhizal formation. Seedling growth and quality responses were considerably less with this inoculum as compared with the Institute's inoculum, with a 2.1 percent increase in seedling fresh weights and a 5.9 percent decrease in seedling culls as compared with uninoculated check plots. Similar results were also obtained from the 1977 *P. tinctorius* container seedling evaluation involving 10 coniferous species in five States.

Seedling cull reduction is one of the most significant benefits in both bare-root and container seedling nurseries. The 32 percent reduction in culls on the Georgia *P. tinctorius*-inoculated plots in 16 bare-root nurseries represents a highly significant potential benefit in plantable seedling production—and in dollar values. This reduction in culls would represent a potential annual increase of 85 million plantable pine seedlings valued at $850,000 in the 55 southern forest tree nurseries.

Nursery Evaluation: 1978 Results

In 1978, the National *P. tinctorius* ectomycorrhizae nursery evaluation was expanded to include 33 nurseries in 28 States (figure 18). A companion

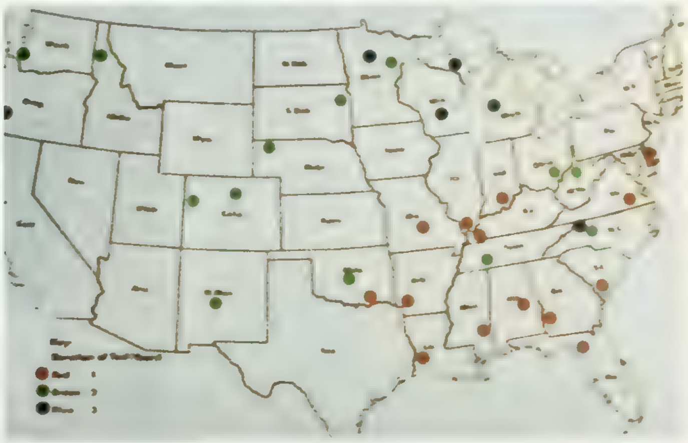


Figure 18.—Distribution of the 33 forest tree nurseries included in the 1978 National *Pisolithus tinctorius* ectomycorrhizae evaluation.

container seedling evaluation was also made in eight continental States along with Hawaii and Canada.

Preliminary evaluation results show the Institute and commercial *P. tinctorius* inoculum to be nearly comparable for forming ectomycorrhizae on a variety of conifer and some oak species on both bare-root and container seedling nurseries over a wide geographic range in the United States and Canada (figure 19). Both inoculum sources produced over 15 percent *P. tinctorius* ectomycorrhizae on a variety of conifer hosts such as Douglas-fir, jack pine, shortleaf pine, loblolly pine, Austrian pine, ponderosa pine, scotch pine, and red pine along with bur oak. Final results from the container and 1-0 bare-root nurseries will be available during 1979. Field outplantings of seedlings from positive *P. tinctorius* treatments and comparative uninoculated check treatments will be established following the termination of the nursery evaluations.

The successful *P. tinctorius* ectomycorrhizal results obtained to date justify optimism concerning the practical application of this fungus for the production of high quality "tailored" seedlings. Such seedlings should have significantly increased survival and growth potentials. The practical and economically feasible application of *P. tinctorius* in southern forest tree nurseries will be evaluated in 1979. Tentatively plans are to produce *P. tinctorius* inoculum commercially for use in the South, in 1980.

FIELD SURVEILLANCE

Field surveillance is a key element in the management of forest insects and diseases in the South. The Forest Insect & Disease Management Staff, Southeastern Area, depends on the assistance of all field personnel to alert them to potential insect and disease problems. Early detection of damage could prevent serious losses in the future.

The Forest Insect and Disease Management staff is strengthening its field surveillance system on Federal lands. To help implement field surveillance a Detection Report, Form 3400-1, has recently been revised (figure 20). This form consists of a booklet of triplicate report sheets which are carbon treated. The reporter sends in the white and blue copies and keeps the pink copy. Directions for shipment of samples and filling out the form are included.

Whenever the causal agent is unknown or confirmation is needed, insect or disease specimens or damage samples should be submitted with the form. Send the report and samples to:

USDA Forest Service
Forest Insect and Disease Management
Bldg 3 - Room 2103
3620 Interstate 85 N.E.
Doraville, Georgia 30340

Copies of the Detection Report booklet are available from the above address.

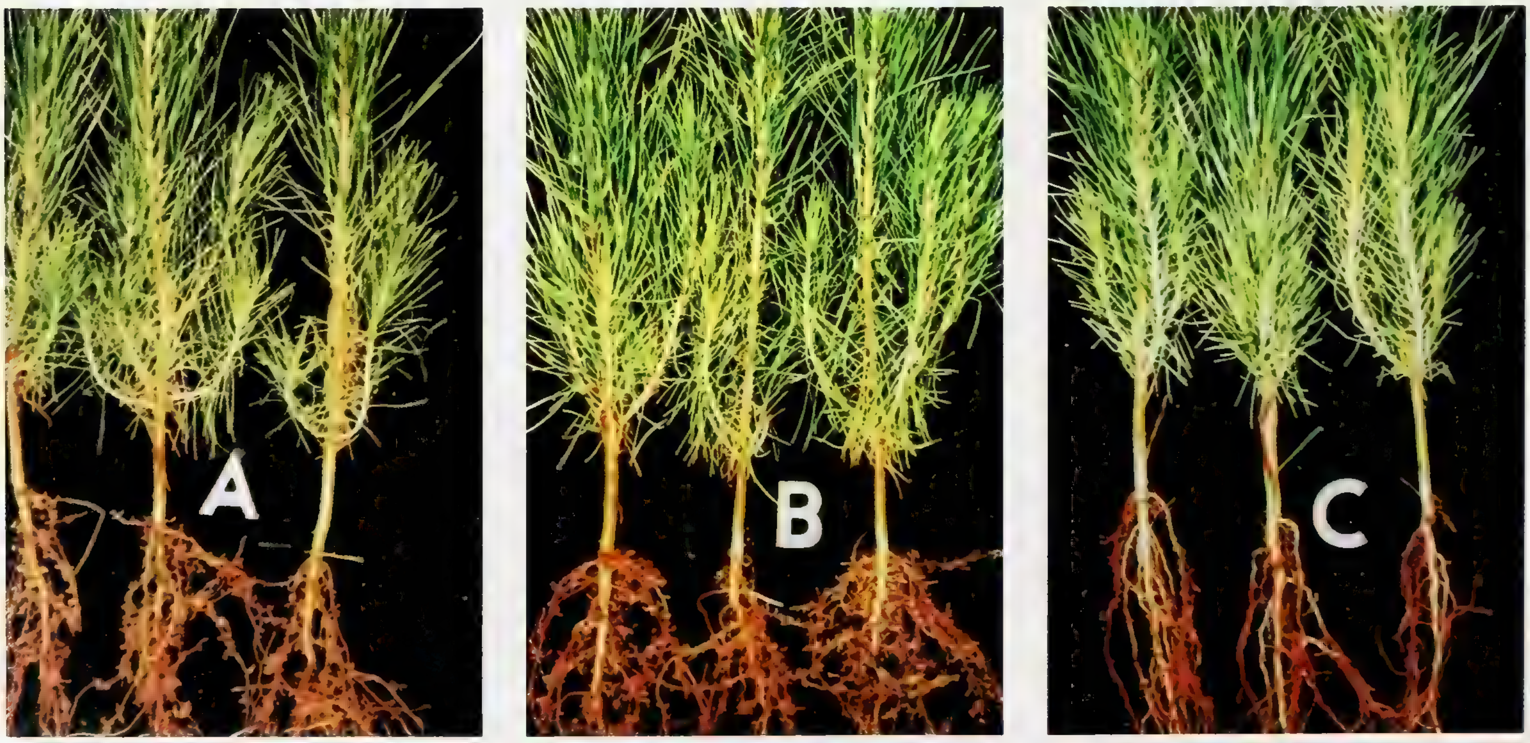
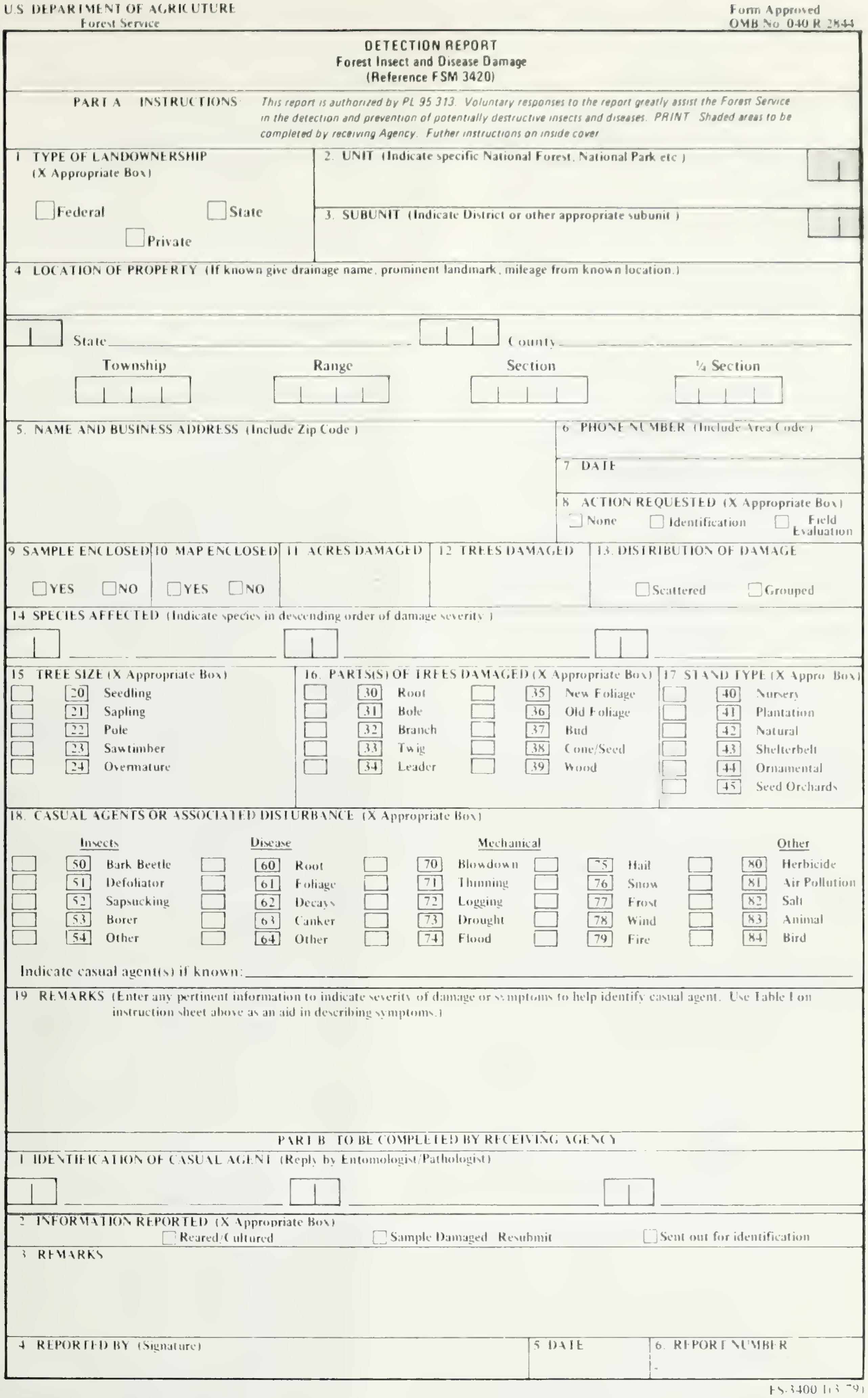


Figure 19.—Ectomycorrhizae occurence on pine seedlings inoculated with *A*, Athens, and *B*, commercially produced *Pisolithus tinctorius* and *C*, untreated seedlings.



U.S. DEPARTMENT OF AGRICULTURE
Forest Service

Form Approved
OMB No. 040 R 2844

DETECTION REPORT
Forest Insect and Disease Damage
(Reference FSM 3420)

PART A INSTRUCTIONS *This report is authorized by PL 95 313. Voluntary responses to the report greatly assist the Forest Service in the detection and prevention of potentially destructive insects and diseases. PRINT. Shaded areas to be completed by receiving Agency. Futher instructions on inside cover*

1 TYPE OF LANDOWNERSHIP (X Appropriate Box)
☐ Federal ☐ State ☐ Private

2. UNIT (Indicate specific National Forest, National Park etc.)

3. SUBUNIT (Indicate District or other appropriate subunit.)

4 LOCATION OF PROPERTY (If known give drainage name, prominent landmark, mileage from known location.)

State ____ County ____

Township ____ Range ____ Section ____ ¼ Section ____

5. NAME AND BUSINESS ADDRESS (Include Zip Code.)

6 PHONE NUMBER (Include Area Code.)

7 DATE

8 ACTION REQUESTED (X Appropriate Box)
☐ None ☐ Identification ☐ Field Evaluation

9 SAMPLE ENCLOSED ☐ YES ☐ NO

10 MAP ENCLOSED ☐ YES ☐ NO

11 ACRES DAMAGED

12 TREES DAMAGED

13. DISTRIBUTION OF DAMAGE ☐ Scattered ☐ Grouped

14 SPECIES AFFECTED (Indicate species in descending order of damage severity.)

15 TREE SIZE (X Appropriate Box)
- ☐ 20 Seedling
- ☐ 21 Sapling
- ☐ 22 Pole
- ☐ 23 Sawtimber
- ☐ 24 Overmature

16. PARTS(S) OF TREES DAMAGED (X Appropriate Box)
- ☐ 30 Root
- ☐ 31 Bole
- ☐ 32 Branch
- ☐ 33 Twig
- ☐ 34 Leader
- ☐ 35 New Foliage
- ☐ 36 Old Foliage
- ☐ 37 Bud
- ☐ 38 Cone/Seed
- ☐ 39 Wood

17 STAND TYPE (X Appro. Box)
- ☐ 40 Nursery
- ☐ 41 Plantation
- ☐ 42 Natural
- ☐ 43 Shelterbelt
- ☐ 44 Ornamental
- ☐ 45 Seed Orchards

18. CASUAL AGENTS OR ASSOCIATED DISTURBANCE (X Appropriate Box)

Insects	Disease	Mechanical		Other
☐ 50 Bark Beetle	☐ 60 Root	☐ 70 Blowdown	☐ 75 Hail	☐ 80 Herbicide
☐ 51 Defoliator	☐ 61 Foliage	☐ 71 Thinning	☐ 76 Snow	☐ 81 Air Pollution
☐ 52 Sapsucking	☐ 62 Decays	☐ 72 Logging	☐ 77 Frost	☐ 82 Salt
☐ 53 Borer	☐ 63 Canker	☐ 73 Drought	☐ 78 Wind	☐ 83 Animal
☐ 54 Other	☐ 64 Other	☐ 74 Flood	☐ 79 Fire	☐ 84 Bird

Indicate casual agent(s) if known: ____

19 REMARKS (Enter any pertinent information to indicate severity of damage or symptoms to help identify casual agent. Use Table I on instruction sheet above as an aid in describing symptoms.)

PART B TO BE COMPLETED BY RECEIVING AGENCY

1 IDENTIFICATION OF CASUAL AGENT (Reply by Entomologist/Pathologist)

2 INFORMATION REPORTED (X Appropriate Box)
☐ Reared/Cultured ☐ Sample Damaged Resubmit ☐ Sent out for identification

3 REMARKS

4 REPORTED BY (Signature)

5 DATE

6. REPORT NUMBER

FS-3400 (1-3-79)

Figure 20.—Detection Report form.

SOUTHEASTERN AREA NUMBERED REPORTS

Report Number	Title and Author
78-1-1	Evaluation of the southern pine beetle infestations on the Chickamauga-Chattanooga National Military Park, by I. R. Ragenovich.
78-1-2	Evaluation of balsam woolly aphid on Roan Mountain, Toecane Ranger District, Pisgah National Forest, N.C., by I. R. Ragenovich.
78-1-3	Evaluation of 2 carbofuran application systems, by Southern Pine Beetle Evaluation, Uwharrie Ranger District, N.C., by I. R. Ragenovich.
78-1-4	Southern Pine Beetle Evaluation, Uwharrie Ranger District, N.C., by I. R. Ragenouich.
78-1-5	Expanded southern pine beetle program; evaluation of several concentrations of chlorpyrifos for remedial and preventive control of southern pine beetle, by I. R. Ragenovich.
78-1-6	Southern pine beetle evaluation, Stearns Ranger District, Daniel Boone National Forest, Kentucky, by I. R. Ragenovich.
78-1-7	An evaluation of shortleaf pine decline and mortality on the Stearns Ranger District of the Daniel Boone National Forest, by P. A. Mistretta.
78-1-8	Fall cankerworm on the Chattahoochee-Oconee National Forests, Nantahala National Forest and Coweeta Hydrologic Laboratory, by J. H. Ghent.
78-1-9	Evaluation of possible insect and disease problems in ice damaged timber on the George Washington National Forest, by R. L. Anderson and P. J. Barry.
78-1-10	Comparison of mist bed and once-a-day watering for germinating pine seed at the Resistance Screening Center, by R. L. Anderson.
78-1-11	Insect and disease conditions on the Red Bird Purchase Unit, Daniel Boone National Forest, 1978, by W. H. Sites.
78-2-1	Report of fusiform rust on slash pine plantations in central Louisiana, by C. E. Affeltranger.
78- 2- 2	Letter to Park Superintendent, Department of Interior, Buffalo National River, by R. C. Loomis.
78-2-3	Evaluation of southern pine infestations on the Kisatchie National Forest, La., by J. D. Smith.
78-2-4	Evaluation of southern pine infestations on the Tiak Division of the Ouachita National Forest, Okla., by T. J. Rogers.
78-2-5	Evaluation of southern pine beetle infestations on the Mena and Caddo Ranger Districts, Ouachita National Forest, Ark., by J. D. Smith.
78-2-6	Evaluation of southern pine beetle infestations on the national forests in Texas, by T. J. Rogers.
78-2-7	Evaluation of southern pine beetle infestations on the national forests in Mississippi, by D. Twardus.
78-2-8	Southern pine beetle infestation, growth and decline—1977, by D. Twardus, G. D. Hertel, and G. W. Ryan.
78-2-9	Preliminary evaluation of the effects of felling a buffer stip on southern pine beetle infestation breakout and proliferation, by D. Twardus and G. D. Hertel.
78-2-10	Bird mortality and insect control when using Furadan On Catawba Timber Company's irrigated pine seed orchard, by G. D. Hertel and L. R. Barber.
78-2-11	Tests with Carbofuran to control the Nantucket pine tip moth on a shortleaf pine seed orchard, by N. A. Overgaard, G. D. Hertel, L. E. Drake, and H. M. Wallace.
78-2-12	An evaluation of insect damage in southern Federal seed orchards (1977) (Stuart - La., Erambert - Miss., Ouachita - Ark., Beech Creek - N.C., Francis Marion - S.C., and Ocala - Fla., by N. A. Overgaard, L. R. Barber, and G. D. Hertel.
78-2-13	A comparison of a fall and winter application of Carbofuran for controlling seed orchard insects on shortleaf pines in Louisiana, by N. A. Overgaard, G. D. Hertel, and H. M. Wallace.
78-3-1	Aerial detection survey: Pedlar, Lee, New Castle, Blacksburg, Wythe and Glenwood Ranger Districts, George Washington and Jefferson National Forests, Va., by P. A. Mistretta, C. W. Dull, R. F. Bassett, and W. A. Carothers.
78-3-2	Aerial detection survey: Claiborne, Copiah, Jefferson and Lincoln Counties, Miss., by C. W. Dull and R. F. Bassett.

Report Number	Title and Author
78-3-3	Aerial detection survey: Delta National Forest, Miss., by R. F. Bassett.
78-3-4	Aerial detection survey: Ocala National Forest and Osceola National Forest, by W. A. Carothers and C. W. Dull.
78-3-5	Aerial detection survey: Cumberland Gap National Historical Park, by W. A. Carothers, and C. W. Dull.
78-3-6	Aerial detection survey: Apalachicola National Forest, Apalachicola and Wakulla Ranger Districts, by C. W. Dull and W. A. Carothers.
78-3-7	Installation and initial tests of LORAN-C AN/ARN-114 (XE-1) in a U.S. Forest Service aircraft, by C. W. Dull.
78-3-8	Aerial detection survey: Bienville National Forest and Strong River Ranger Districts, DeSota National Forest, portions of Chickasawhay Division, by C. W. Dull and R. F. Bassett.
78-3-9	Aerial detection survey: Holly Springs National Forest, Miss., by W. A Carothers and B. I. Hammond.
78-3-10	Aerial detection survey: Natchez Trace Parkway (Jackson north) Miss., Tenn., Ala., by W. A. Carothers.
78-3-11	Aerial detection survey: Federal, State and private lands in Mississippi, by R. F. Bassett, P. A. Mistretta, and R. Collins.
78-3-12	Aerial detection survey: Chickamauga and Chattanooga National Military Park, W. A. Carothers and B. I. Hammond.
78-3-13	Aerial detection survey: Federal, State and private land in Alabama, by P. A. Mistretta, and J. Knighten, and R. Kucera.
78-3-14	Aerial detection survey: Nantahala National Forest, N.C., by W. A. Carothers.
78-3-15	Aerial detection survey: Cherokee National Forest, Tenn., by W. A. Carothers and C. W. Dull.
78-3-16	Aerial detection survey: Delta National Forest, Miss., by W. A. Carothers.
78-3-17	Aerial detection survey: Pisgah National Forest and private lands within national forest boundaries, by C. W. Dull.
78-3-18	Aerial detection survey: William B. Bankhead National Forest and private lands within the national forest boundary, by C. W. Dull.
78-3-19	Aerial detection survey: Conecuh National Forest and private lands within the national forest boundary, by C. W. Dull.
78-3-20	Aerial detection survey: State and private lands, Miss. and Ark., by W. A. Carothers.
78-3-21	Aerial detection survey: Natchez Trace Parkway (Jackson south), Department of Interior, National Park Service, by W. A. Carothers.
78-3-22	Aerial detection survey: DeSoto National Forest, by W. A. Carothers.
78-3-23	Aerial detection survey: Ouachita National Forest, by W. A. Carothers and P. A. Mistretta.
78-3-24	Aerial detection survey: Ozark National Forest, by P. A. Mistretta.
78-3-25	Aerial detection survey: Tuskegee National Forest and private lands within the national forest boundary, by C. W. Dull.
78-3-26	Aerial detection survey: Talladega National Forest and private lands within the national forest boundary, by C. W. Dull.
78-3-27	Aerial detection survey: Uwharrie National Forest, by W. A. Carothers.
78-3-28	Detection of forest insect activity on the Shenandoah National Park, by C. W. Dull.
78-3-29	Detection of forest insect activity on the George Washington National Forest, by C. W. Dull.
78-3-30	Aerial detection survey: Croatan National Forest, by W. A. Carothers.

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